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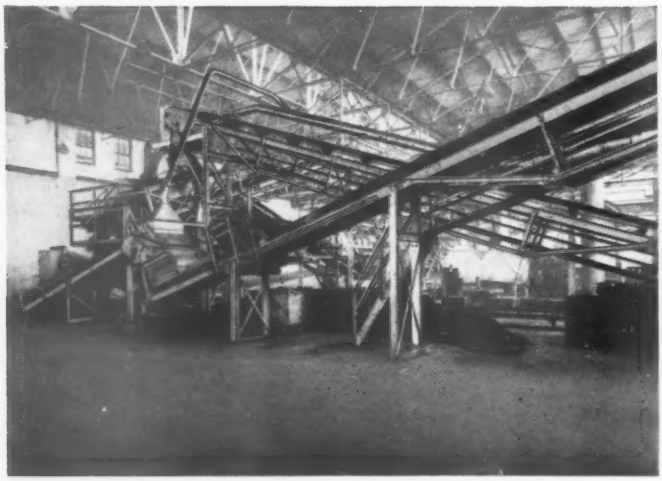

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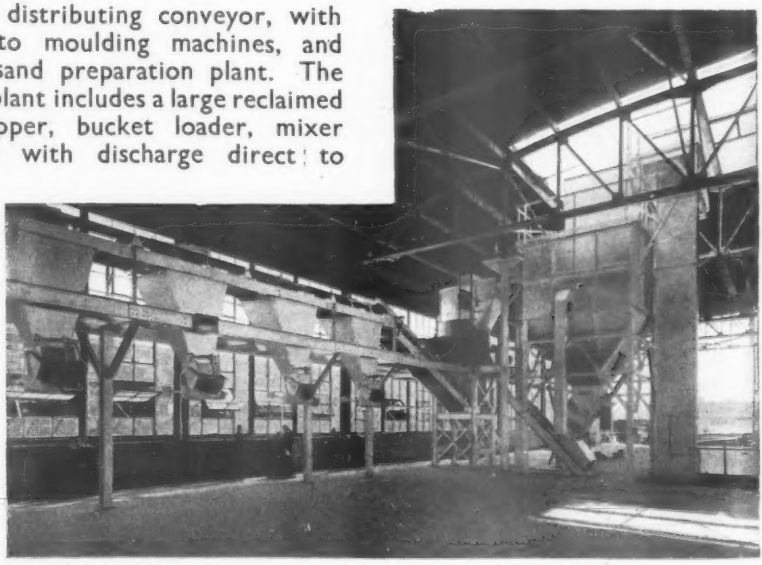

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The 1956 Factory Report

The 1956 Factory Report is the last to be signed by Sir George Barnett, as he retired at the close of 1957. During his period as Her Majesty's Chief Inspector of Factories, there was a steady reduction in the number of fatal and non-fatal factory accidents, and this must be a source of satisfaction to him in his retirement, and an inspiration to his successor Mr. McCulloch and his staff. Whilst some of the Factory Regulations seem and indeed are onerous, the number of lives saved during the last decade—for that is the way to regard fatal accident reduction—certainly gives a pleasing background to the picture of industrial accident prevention. The Report states that there were 163,332 accidents notified in 1955, and 160,116 in 1956, a reduction of 2 per cent. Fatal accidents were given for 1956 as 426, a figure which follows the general decreasing trend. The foundry industry in 1955 reported 9,338 of which 17 were fatal. This figure shows a reduction of 336 over a year earlier, and is a 3.5 per cent. improvement, which compares well with the overall industrial figure of 2 per cent. There is, however, no room for complacency, for the frequency rate of accidents in foundries is bracketed third on the industrial group list.

A special chapter (17) is devoted to the Iron and Steel Foundries Regulations, 1953, and from it, we gather there has, in general, been good compliance, but no direct clear statement is made. After lauding the efforts made by some foundries one aspect, that is the closing down of foundries, is covered by this general statement: "At the other end of the scale, there are reports that some 'marginal' firms have decided to close their foundries. In almost all cases, these are extremely small businesses, run usually by an elderly proprietor with partners and one or two employees, often also elderly. Whether the impact of the Regulations is the sole cause that these firms have gone out of business is, of course, a matter of conjecture." We have been unable to visualize just what "marginal" firms are. One interpretation—probably a wrong one—is that they were really workshops and not truly factories. If this be so we should like the Factory Regulations to apply to factories and the old Workshop Regulations resuscitated or suitable new ones made. The chapter includes many references to excellent examples of real enterprise shown by managements to give the best working conditions for their men, moreover there are some quite useful practical hints. There is a general admission that compliance with the new Regulations is not easy, and two cases are quoted where new buildings had to be provided. The Report has noted the advent of CO_2 moulding and coremaking practice and commends it from the angle of fume reduction, as no mould or core drying is needed. Difficulties are also noted in connection with knock-out operations and two failures were ascribed to ill-designed plant. Successes are recorded when using very high powered exhaust systems associated with, what we should imagine to be, extensive air-recirculating systems. This problem of knock-out ventilation must vary according to the size of the foundry and the castings produced and whether the castings are cored or not.

There are many other aspects of safety discussed in the Report. An effort originating in Birmingham, which we have commended in our columns, is devoted to the training of personnel in the practical aspects of safe-working in factories. It is highly praised by the Chief Inspector, and similar "schools" could usefully be established in other areas. The Report also deals, on page 39, with what is a "competent" person. One presumes he is the assistant of an "authorized" person. As, however, it may cost a firm much money to have a legal decision on this point, we recommend a study of this quite illuminating discourse on the subject. It is a matter which needs clarifying as the word often appears in Regulations. The incidence of a fire in a works, in relation to loss of life and accidents, is considered in some detail. The story of a mill fire in Keighley is a real journalistic effort in its realism. It seems that all fires, whether resulting in a fatal accident or not, have to be reported to the Inspectorate. We agree that it is only wise for executives to look around their works, imagine a serious fire, and to make up their minds whether everything has been done to minimize any potential threat to human life.

The Report, though smaller this year than last, is later in its publication, and it is interesting to learn that there is a movement on foot to publish quarterly some of the material it contains. The Report costs 9s. 6d. net and is obtainable from H.M. Stationery Office, York House, Kingsway, London, W.C.2, or any bookseller.

Yorkshire Copper and ICI Merger

Negotiations aimed at combining the activities of the Yorkshire Copper Works, Limited, and Imperial Chemical Industries, Limited, in the copper, and copper-alloy tube and plate industry, have now reached a stage when Yorkshire Copper Works can submit merger proposals to shareholders. They will be put before an extra-ordinary general meeting to be held on January 27.

It is proposed to effect the merger by forming a new company, Yorkshire Imperial Metals, Limited, the share and loan capital of which will be owned equally by the two companies. The final issued share capital of the new company will be £1,000,000 in £1 ordinary shares, with the major part of the consideration payable by it remaining as identical loans owed to ICI and Yorkshire Copper.

The value of fixed assets to be transferred to the new company by ICI is shown at £6,706,773 and it will provide net current assets of £4,019,393. Yorkshire Copper will provide fixed assets valued at £4,460,655 and net current assets of £3,579,393. The equality of interests in the new company, notwithstanding that the value of assets to be provided by ICI will exceed that to be provided by Yorkshire Copper, is, it is stated, to compensate for the fact that profit figures of the ICI undertaking have been less than those of Yorkshire Copper.

The ICI undertaking has been going through a period of major reconstruction and reorganization over the past five years, and this has had a marked effect upon earnings which, during the first 10 months of 1957, were estimated to be about 60 per cent. of Yorkshire Copper's profits over the same period.

The directors of the Yorkshire Copper Works stress that the proposals represent long-term policy and that the advantages will not be felt immediately. In fact, as it will take some time to effect economies, there may be some reduction in profit earnings. A quinquennial valuation of fixed assets of Yorkshire Copper shows a surplus of £1,108,228, which has been added to capital reserves. The previous surplus was £880,966. Of current assets of £5,106,161 (£5,301,648) stocks are responsible for £2,749,771 (£2,834,961). In 1956-57 net profit contracted to £420,117 (£643,782) with the distribution unchanged at 15 per cent.

Beilby Memorial Awards

From the interest derived from the invested capital of the Sir George Beilby Memorial Fund, at intervals to be determined by the Administrators representing the Royal Institute of Chemistry, the Society of Chemical Industry and the Institute of Metals, awards are made to British investigators in science to mark appreciation of records of distinguished work. Preference is given to investigations relating to the special interests of Sir George Beilby, including problems connected with fuel economy, chemical engineering and metallurgy. The awards are made, not on the result of any competition, but in recognition of continuous work of exceptional merit bearing evidence of distinct advancement in science and practice. Consideration will be given in due course to the making of an award or awards from the fund for 1957. Outstanding work of the nature indicated may be brought to the notice of the administrators, not later than February 28, by letter addressed to the Convenor of the Administrators, Sir George Beilby Memorial Fund, the Royal Institute of Chemistry, 30, Russell Square, London, W.C.1.

Dinner

WORSHIPFUL COMPANY OF FOUNDERS

The annual livery dinner of the Worshipful Company of Founders was held, by the courtesy of the Lord Mayor, at the Mansion House on January 7. The Master of the Company, the Rev. R. B. R. Walker, B.A., presided. Interesting speeches were made by the Master; the Lord Mayor, Sir Dennis Truscott, T.D.; Mr. N. P. Newman, J.P.; the Rev. S. H. Evans and the Rev. W. H. Dormor. Others at the high table were the Rt. Rev. the Lord Bishop of Tewkesbury, Mr. W. B. Franklin, Lt.-Col. B. B. N. Woodd, M.A., Mr. Gilbert Ledward, O.B.E., R.A., Lt.-Col. R. J. Cotterell, F.R.I.C.S., Mr. A. Stanley Young, Major L. E. Cotterell, T.D., Mr. Edward J. Mornement, Mr. W. A. Muir, Mr. Albert Harris, Mr. John C. Taverner, Mr. A. Gordon Young, C.C., Mr. J. Arthur Taylor, Mr. A. J. Parrott, Mr. Deputy C. G. Dickson, Lt.-Col. A. R. Marshall, T.D., Col. R. H. Studholme, O.B.E., M.C., M.A., Mr. John Blakiston, Mr. W. Stovin-Bradford, Dr. J. B. Bishop, Mr. D. S. Young, C.C., Mr. J. T. Combridge, Mr. S. G. Lawrence, Mr. G. M. Menzies, Sir C. Lillicrap, Air Chief Marshal Sir Frederick Bowhill, G.B.E., K.C.B., Dr. C. L. G. Pratt, O.B.E., M.A., Mr. Frank A. Harrison, Mr. L. H. Corbould-Ellis, Mr. C. Broom Smith, J.P., Vice Admiral H. P. Koelle, C.B., Major Charles H. Cromwell, U.S.A.F., Mr. Kenneth Davis, Mr. W. G. Fossick, M.A., Mr. Barry C. Grigg, Mr. C. F. L. St. George, C.B.E., Mr. Sheriff S. R. Walker, C.B.E., C.C. Deputy (The Upper Warden), Mr. L. J. Rivett, Mr. C. Littler Smith (The Under Warden) and Mr. Alderman and Sheriff Anthony G. Clifton Brown, T.D. The stewards were Mr. V. C. Faulkner and Mr. Brian H. Colquhoun. During the evening there was a programme of music by the Templars under the direction of Victor Marmont.

Buxton Conference Fund

The Council of the Institute of British Foundrymen acknowledges with appreciation the following subscriptions received for the special fund which is being raised in connection with the conference to be held in Buxton in May.

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International Views on Foundry Ventilation

Extracts from Papers presented at Stockholm

One of the main themes of the twenty-fourth International Foundry Congress, held in Stockholm, was foundry health and ventilation. In this category, several papers were contributed from which abstracts of the material of more general interest are reproduced in what follows. It might fairly be said that the overall picture conveyed is representative of world views on these topics and steps taken both individually and nationally towards ameliorating foundry working conditions. Despite this, it will probably be felt by some readers that the reports do scant justice to the tremendous developments in those matters initiated in the UK and the absence of contributions on such subjects to the conference from this country is perhaps lamentable.

Health Hazards in Foundries and their Prevention

By Mr. A. Ahlmark and Mr. H. Ohman

Summary

The commonest health risks associated with work in foundries, *i.e.*, air pollution of various types, heat radiation and noise, are here surveyed. The air-polluting agents, it is pointed out, consist of dust, fumes and gases. The symptoms which these may produce are outlined and the concentrations that should not be exceeded in foundry air are defined. Some physiological norms for heat radiation and noise are also discussed.

In steelworks the danger of silicosis has long been recognized, and extensive measures have therefore been taken to reduce the atmospheric content of quartziferous dust. Iron foundry workers, too, are exposed to a risk of pulmonary disease, silicosis and siderosis caused by the inhaling of dust. On the basis of dust measurements in various foundries, the principal hazards are described, together with measure designed to obviate them in connection with furnace and melting work, sand preparation, coreshop work, moulding, pouring, knocking-out and core removal, fettling and sand blasting. The effectiveness and value of various means of prevention are illustrated by the results of practical field investigations.

In evaluating the risk of silicosis in iron foundries, the important difference between small and large foundries must be taken into account. In the former much of the work is done by hand, without any appreciable mechanization; moreover, the foundryman often carries out all working operations, from sand preparation and moulding to casting and knocking-out. But in big foundries, which as a rule are more mechanized, there has been increasing specialization, different workers being assigned to different jobs. There may also be appreciable differences between foundries with regard to output, size and quality of the castings as well as to the planning of the foundry work. Yet, the dust production associated with the various working processes is the same in principle.

In foundries with a high degree of mechanization excellent prerequisites have been established, however, for an adequate solution of dust problems. Enclosure and exhaust ventilation for dusty processes can generally be arranged satisfactorily in these foundries, in contrast to those where hand moulding, casting and knocking-out are done on the foundry floor. In foundries with roller way mechanization and continuous casting and knocking-out, enclosure and exhaust ventilation of the latter process are usually possible.

In the following paper, the especially dusty operations will be treated and at the same time some of the chief measures in the field of occupational hygiene will be discussed. For further details, reference should be made to the special literature[1].

To facilitate the review of the subject, the foundry work is classified as according to the processes commonly occurring in the following groups: 1. Furnace and melting work; 2. sand preparation; 3. coreshop work; 4. moulding; 5. pouring; 6. knocking out and core removal; 7. fettling; 8. sand blasting.

Furnace and Melting Work

Dust surveys in chipping out of a cupola have shown relative dust counts ranging from 20 to 340 and a quartz content of 35 per cent. in particles below 0.005 mm., and such figures involve a dangerous proportion of dust. In charging a cupola at another foundry, an average dust count of 17 (5 per cent. quartz) was recorded, and this lies below the limit value defined. The work here was to a large extent mechanized. An average of a large number of determinations of the dust content associated with chipping out of cupolas in Sweden showed a median value of 80 and a mean of 130. Corresponding figures from several American investigations were 88 and 124 respectively, and so showed very close agreement.

Cupola attendants are exposed to large amounts of dust when removing and shovelling coke and slag, relining furnaces or forehearths, and tidying up in the vicinity of the furnaces. In order to reduce dust, the dump and the hot surfaces in the furnace should therefore be wetted before treatment. For removal of the dust arising in the course of the work, the draught in the flue should be utilized. For work inside a forehearth a compressed-air mask is required.

* Mr. Axel Ahlmark was born in 1913. M.D. 1945. Professor at the National Institute of Public Health, Stockholm, Sweden. Mr. Harry Ohman was born in 1916. Graduated in 1937. Research assistant at the National Institute of Public Health, Stockholm, Sweden.

International Views on Ventilation

Silica brick and quartzite, which have high contents of free silica are often used for the lining of furnaces. Pneumatic machines are employed in some foundries for coating the inside of cupolas with silica instead of relining the furnaces by hand. The work is executed by two men, one operating the machine and the other—usually equipped with a compressed-air helmet—spraying the silica in the cupola flue. The machine attendant, who is generally unprotected, may be exposed during this work to considerable amounts of dust with a relatively high quartz content, particularly when the machine is placed too near the cupola and the lower part of the furnace is sprayed. Although the working time with this machine amounts to only about one hour per day, the attendant should be fitted with a suitable mask. An average dust count of 51 has been determined in respect of the machine attendant in a foundry, and the quartz content of the dangerous particles was 62 per cent.

A melting shop usually has two or more cupolas which are operated alternately, *i.e.* iron production goes on in one of them while the other is being relined. When a cupola is charged, furnace gas may leak out and diffuse into the workshop. The furnace attendants on the top platform (melters) and the chargers will then be exposed to carbon monoxide. Adequate ventilation round the furnace is essential, and the best plan is to arrange exhaust hoods for the removal of the leaking gas usually rising from hot surfaces. Carbon monoxide contents ranging up to 0.04 volume per cent. have been determined in different foundries, the highest values being recorded in wintertime.

Sand Preparation

When dry sand is shovelled or conveyed to the mixer, large amounts of dust arise. To prevent the spread of this the mixer can be enclosed and exhaust ventilation applied. The sand should be moistened before use. Drying and screening of sand from which core sand is prepared should be done in isolated well-ventilated compartments, drying boxes or closed hoods. Dust investigations in mechanized core-sand preparation showed an average dust count of 13 and a quartz content of 14 per cent. in particles less than 0.005 mm.; the corresponding figures at another foundry without mechanized sand preparation were 28 and 8 per cent. respectively. A schematic appraisal, according to American norms, of the results would lead to the conclusion that the mechanized sand preparation was innocuous but in the non-mechanized one a silicosis risk was present. However, such categorical evaluation appears to be inadvisable, for in view of the above dust counts and quartz contents, there is reason to believe that exposure to quartz dust was only very slightly lower in the first-named case.

Moulding-sand Preparation

In moulding-sand preparation, evolution of dust is greatest in the charging of rolling mills with dry pulverized material. Moulding sand mixers should therefore be enclosed and exhaust ventilation applied, in order to prevent dissemination of dust, and water should be added as early as possible in the process. Advanced mechanization is practicable in moulding-sand preparation, and facilitates dust suppression. Dust investigation in a foundry where moulding-sand preparation was unsatisfactory in this respect showed average dust counts, for the sandmixer, of about 80 per cent. and a quartz content of 8 per cent. in the particles below 0.005 mm. Here, too, dust from the sand preparation spread to other parts of the foundry. In highly-mechanized moulding-sand preparation at another foundry, the corresponding dust count was only 19 and the quartz content 5 per cent.

In hand-moulding foundries the moulding sand is often returned after knocking-out to the moulding place, where it is first screened, usually through a simple vibrating screen for the removal of iron, large lumps of core sand, etc. An adequate amount of water should be added here before screening, so as to avoid unnecessary dust evolution in shovelling, mixing and screening. The major importance of this is evident from an investigaton in which the average dust count associated with screening at a foundry fell from 150 to 10 after the sand had been moistened.

Where machine moulding occurs, the sand preparation is usually centralized, thus facilitating mechanization. Here it is also easier to arrange watering, enclosure and exhaust ventilation of the dust-producing processes. The use of compressed-air jets for clearing workshops and equipment should be prevented; instead, watering and vacuum cleaning are recommended.

Coreshop Work

Dust evolves in the dressing of dried cores, as for instance polishing, sawing or brushing. Another dusty process consists in the spraying of moulded cores with suspensions containing quartz. Dust investigations in moulding of cores, and in brushing of them after oven drying, have yielded average dust counts of 6 and 83 respectively. In the processing of cores it is therefore advisable to apply exhaust ventilation by doing the work close to an exhaust hood, which can if necessary be movable.

Moulding

Hand- and machine-moulding with moist sand produces only small amounts of dust. The airborne dust usually consists of deposits on the foundry floor, flasks, machines, etc. which are dislodged during the work. Parting sand, graphite, talcum and the like, applied to the mould in dried form, also pollute the air. Cleaning of moulds by compressed-air jet is practised to a very large extent and is an important source of atmospheric pollution. In machine-moulding the sand is generally conveyed to the machine from a hopper located above it. A certain amount of hand-screening, too, may occur at times. The dust evolution in these processes is largely dependent on the effectiveness of sand preparation, *i.e.*, on the homogeneity with which the sand is moistened. After long intervals of work, drying of the moulding sand has usually occurred. This means increased exposure of the moulder to dust.

Sandslingers are employed in some foundries for conveying moulding sand to the flask. These machines require careful sand preparation if the dust risk for the foundrymen is to be kept at a minimum. However, the sandslinger attendant is usually exposed to relatively high dust contents when he stands close to the slinger, even if the sand preparation is well executed. The average dust counts for sandslinger attendants which have been reported in Swedish and American investigations are closely consistent: 10 to 12 as the median value and 10 to 20 as the mean.

In moulding work the following dust-suppression measures are recommended in addition to the use of non-siliceous material in parting sand and the like:—(1) Regular watering of the foundry floor and place of work, (2) the use of a vacuum cleaning system—not compressed air—for cleaning and dusting of flasks, machines, etc., (3) checking of the humidity of the parting sand before work begins.

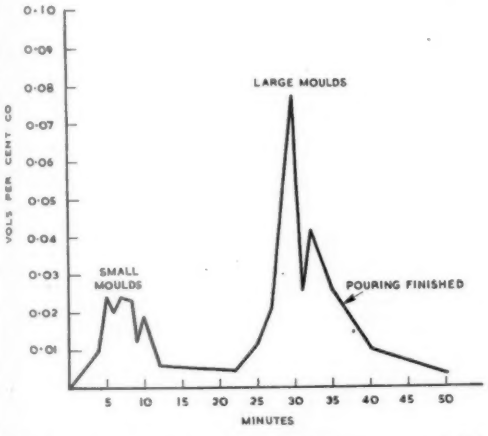

FIG. 1.—*Graph showing atmospheric content of CO at breathing level of the worker during the pouring process at a foundry making small castings.*

In the above-mentioned processes, the sandslinger attendant should be equipped with an appropriate compressed-air mask or helmet if exposure to dust cannot be prevented by better means.

Dust from soiled working garments may constitute an unnecessary exposure at work. Hence it is the practice at some foundries to blow the dust out of this apparel daily by means of compressed air, but vacuum cleaning methods are recommended as a preferred alternative. Drying ovens for cores and moulds may discharge fumes and gas containing CO into the foundry atmosphere. These ovens should be so designed and ventilated as to prevent pollution of the work place by such substances.

Pouring

The heat emitted from molten iron in ladles and moulds causes the rapid drying of the foundry floor. With the swift working tempo and the movements which casting necessitates, large amounts of dried dust are raised from the floor into the air, and the strong air motions arising in the proximity of the hot castings spread the dust still more. To overcome this scattering of dust during pouring, floor and conveyor paths in the foundry should be watered before teeming begins. Watering may be continued during the casting process itself, though the greatest care should be taken to prevent any molten iron that falls to the floor coming into contact with large amounts of water.

In foundries with rollway or conveyor mechanization, casting can be centralized and exhaust ventilation applied at the places where it is done. The drying of ladles is often done by direct firing or by heating with gas jets. This frequently serves to spread fumes and gases in the foundry. In one foundry, CO contents of between 0.005 and 0.02 volume per cent. were determined at breathing level during the firing process.

Carbon monoxide also evolves in casting, due to incomplete combustion of the carbon and other organic compounds in the moulding sand and the iron carbon. The exposure of foundrymen to CO is dependent, among other things, on the mode of casting (mechanical or otherwise) and on the ventilatory facilities. Determinations of the atmospheric content of CO at breathing level of a worker during the pouring process at a foundry for small iron castings are exemplified in Figure 1. Casting in this case was done with continuous knocking-out on the rollway. Expired gas from the foundrymen was analysed with respect to its CO content before and after the work. The CO-hemoglobin content of the blood was then approximately determinable. It was found to have risen by 5.6, 5.4 and 5 per cent. after this exposure to carbon monoxide.

Knocking-out and Removal of Cores

Since knocking-out of moulds and removal of cores from the castings generally take place while the latter are extremely hot, powerful air motions arise in their vicinity, with a consequent dustiness in the atmosphere. The same is the case with dry-sand moulds. In green-sand moulding the sand contiguous to the casting itself dries and falls off at the knock-out, so that some dust evolves there too. This is illustrated by dust investigations conducted at two foundries where both green-sand and dry-sand casting was done. In one of them, the dust counts averaged 13 for green-sand knocking-out and 60 for dry-sand knocking-out; in the other, 28 and 116 respectively.

Various mechanical knocking-out devices, vibrators, etc., also spread dust in the air and in knocking-out of small castings by hand—when the work usually proceeds at a high tempo—dust arises when flasks and castings are dropped on to the floor. The dust-suppression measures in this work vary according to the mode of procedure employed. In knocking-out of small castings over the whole of the foundry floor, or of very large castings, exhaust ventilation is mostly impracticable.

In these cases the following measures can be recommended:—

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(1) Let the casting cool off as much as possible; (2) wet the floor and moulds before and during knocking-out. A water jet, correctly applied, is quite effective; (3) place small castings in suitable containers and cart them away as soon as possible; do not scatter flasks, drags, etc., over the foundry floor any more than is necessary; (4) have the knocking-out done, if practicable, at times when as few foundrymen as possible are at work; (5) secure the greatest possible general ventilation with the aid of mechanical devices in the foundry during knocking-out; (6) in foundries where knocking-out is centralized, exhaust ventilation should be applied at the place where it is done. The exhaust hoods should be designed with due regard to the size of the castings and the knock-out methods.

The difficulties in removing cores from the casting may vary, for instance, with size and shape. Frequently used in this operation are pneumatic tools, compressed-air jets and/or spraying with water. Special machines are employed in some foundries for removal of cores from small castings. Core-removal generally evolves a large amount of dust and this work should accordingly be separated from the rest of the foundry, if possible in well-enclosed cabinets or in compartments equipped with exhaust ventilation, preferably using mechanical devices for removal of the knocked-out core sand.

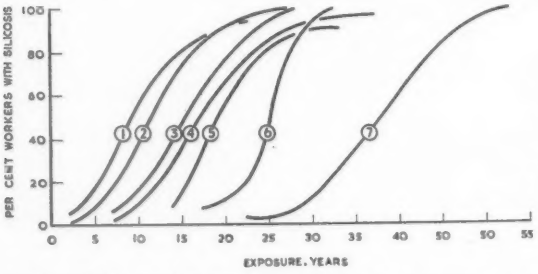


FIG. 2.—*Calculation of time of onset of silicosis among various classes of workers in steelworks and steel foundries.*

(1) Crushing of quartz (2) Steel fettling (3) Grinding (sandstone wheel) (4) Pottery making (moulding, fettling, etc.) (5) Furnace bricklaying (6) Glazing (in ceramic industry) (7) Steel moulding.

Fettling

Virtually all processes in the fettling shop are associated with evolution of dust, and for this reason all fettling should be confined to a separate workshop. Moreover, the dusty operations call for properly-designed enclosure and exhaust ventilation to obviate spread of dust to the air in the fettling shop.

In rough cleaning, often done with pneumatic chisels, it may be very difficult, especially in the case of large castings, to prevent dangerous exposure of the fettler to dust. Compressed-air masks or dust respirators must be used here. However, the castings should always be watered to the greatest possible extent. Ventilating devices are common for fixed abrasive wheels, rumblers, sand-blasting plants and, to some extent, for swing-frame grinders too. Yet the efficiency of these arrangements may vary considerably. There have been cases of almost total blockage of ventilation pipes, with, consequently, inadequate volumes of air passing through the exhaust hoods. In some instances, too, the enclosure is unsuitable. Fixed grinding machines exist, however, which are excellently designed in these respects. A very large part of the abrasive wheel should be enclosed, and the air current must be screened from the wheel. Further, the work rest should be perforated and fitted with an exhaust.

Dust surveys have been conducted during the grinding of different-sized castings in such machines; the average dust-count has been as low as 7. In this instance the casting has been cleaned in a wet-scrubbing machine before grinding, and hence its surfaces were free of moulding sand. The quartz content of air-borne dust particles of less than 0.005 mm. which were associated with this type of casting amounted to no less than 9 per cent. in spite of prior cleaning.

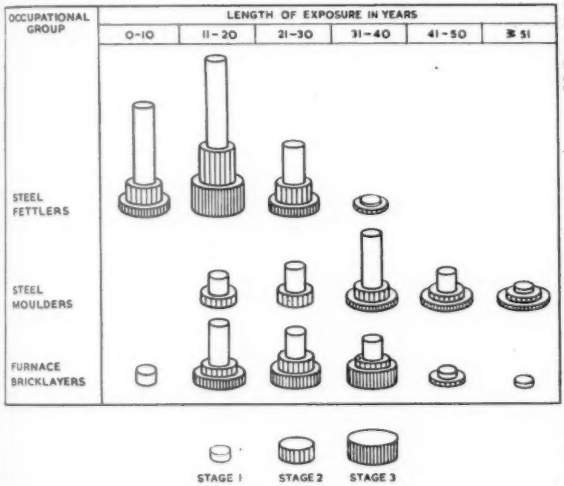
Where hand-grinding machines are generally used in fettling shops without special exhaust ventilation close to the work itself, very high dust concentrations are found in the air, even if the general ventilation is good. An average dust-count of 167 was measured during work with hand-grinding machines in one fettling shop. The quartz content of dust particles below 0.005 mm. was, at the same time, 12 per cent. Due to the atmospheric pollution caused by hand grinding, the average general dust-count in this fettling shop was no less than 45. In another fettling shop where the work with hand-grinding machines was done in separate ventilated cabinets, an average dust-count of 34 was recorded in the cabinets, and a quartz content of 6 per cent. in dust particles below 0.005 mm. There was no diffusion whatsoever to the air in the rest of the fettling shop. Dressings of castings with hand-grinding machines should be done in ventilated cabinets, enclosures or on benches fitted with powerful exhaust ventilation. In the cleaning of fairly large castings with hand-grinding machines where methods referred to above are impracticable appropriately designed, movable exhaust-hoods should be employed for removal of dust evolved.

Regular cleaning of the fettling shops, and especially of the ventilation devices, is an important feature of the dust-suppression measures. Certain workers in pig-iron foundries should be medically examined both before engagement—so that persons susceptible to silicosis will not be employed for such work—and after, say, employment for ten to

twenty years. This group includes moulders, casters and others working with siliceous material, as for instance, assemblers, coremakers and labourers. In the case of sandmixers, knock-out men and fettlers —who as a rule are more exposed to dust—the first medical check should already be made after five to ten years, depending on the hygienic standard at the foundry.

Steelworks and Steel Foundries

Several occupational groups in the steel industry are exposed to siliceous dust on such a scale as to invoive a risk of silicosis. Foremost among them are the workers engaged with quartz-crushing, furnace bricklayers and labourers, as well as ladlemen and mortar mixers. Earlier in the paper statistical data were quoted concerning cases of silicosis occurring in steel foundries and steelworks. They showed a by no means inappreciable



number of both mild and severe cases among certain occupational groups in the steel industry. This state of affairs is further illustrated in Fig. 2, where the time of onset of silicosis in steel fettlers and furnace bricklayers and so on has been calculated according to Bruce*. It is evident from the figure that every second steel-casting cleaner had already acquired the disease after 10 to 15 years, and that after 20 to 30 years nearly all of them were affected. Among furnace bricklayers the duration of exposure in the silicosis cases averaged about 20 years. These data are based on studies made in the late 1930's. Stages of silicosis in relation to the onset of symptoms in a few groups of steelworks employees during the period from 1931 to 1954 are surveyed in Fig. 3. It shows the relative hazards for fettlers, moulders and furnace bricklayers.

The silicosis risk in quartz-crushing plants is often great and calls for meticulous dust-prevention if it is to be effectively combated. In view of the high quartz content of the dust, only very slight dustiness should be tolerated. The preventive measures in the crushing, screening and conveyance of dry material chiefly aim at reducing the siliceous dust-content of the inhaled air by watering the material and by enclosure and exhaust ventilation of the working operations. Furnace bricklayers

TABLE I

Work.	Dust count.	Quartz per cent. (approx.)
Silica bricks	27	50
Ramming of quartz in furnace ..	20	50
Mortar mixing in roller mill	40	20
Chipping out of hot ladle	45	Not estimated

and their labourers are exposed to dust *e.g.* when dressing bricks, both with saws and by hand, when ramming quartz in furnaces, and when dismantling furnaces. The free silica-content of the dust inhaled during these operations is dependent on the material being treated. Silica brick, a common furnace-lining material in the steel industry, chiefly consists of

FIG. 3.—*Stages of silicosis in relation to the onset of symptoms in a few groups of steelworks employees during the period from* 1931 *to* 1954. *The calculation attempts to define the relative hazards for various occupational groups.*

crystalline forms of silica, notably quartz; whereas chamotte and other types of bricks contain only small amounts of those forms. Generally the mortar has a very high quartz-content. The dust production in some operations connected with furnace and ladle bricklaying is illustrated by the analytical values given above (Table I), recorded during investigations in a Swedish steelworks. The figures suggest that the men engaged on these operations had been exposed to an appreciable silicosis risk, at all events in the case of the first three types of work.

Dust Production Areas

Brick saws should be well-enclosed and exhaust ventilation should be applied. When bricks are dressed by hand for appreciable lengths of time, the work should be done close to a suitably-shaped exhaust hood preventing diffusion of the dust. When quartz is rammed, for instance, in electric-arc furnaces, a movable exhaust-hood should be placed at the firing hole. The greatest care is required in shovelling the dry silica flour into or out of barrows, and to the furnace. The barrow should be placed as near to the exhaust hood as possible when the silica flour is tipped into the furnace.

The dismantling of furnaces is an extremely dusty operation. Furnaces due for dismantling

* See Acta. med. Scand., 1942. Supplement 129.

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have generally been in use for long periods and much of the brickwork has been heated to high temperatures. Hence, a good deal of the quartz may have been transformed into other forms of silica, tridymite and, perhaps, cristobalite, which substances also tend to produce silicosis. In the dismantling of furnaces, water should be applied liberally, and sometimes exhaust ventilation may be advisable. Since, however, it is probably difficult by technical devices to eliminate the exposure to dust, respirators should be worn during this operation.

The work of ladlemen includes chipping out and relining ladles, and frequently they mix the requisite mortar themselves. Although the exposure to dust has not been elucidated in respect of this occupational group, there have been occasional dust investigations which indicate a risk of silicosis. Since silicosis has occurred in ladlemen, dust-suppression measures mut be taken in accordance with current norms.

In steel foundries there is a silicosis risk for, broadly speaking, the same occupational groups as those in iron foundries; *i.e.*, furnace workers, sandmixers, coremakers, casters, knock-out men, and fettlers. However, the quartz contents of small dust particles are considerably higher in steel than in iron foundries; hence the risk, as pointed out earlier, must be greater. The dust-suppression measures should be commensurate, meticulous attention being given to each and every one of them. In principle, they should follow the general lines already indicated for the relevant occupation groups in iron foundries.

In order to reduce the silicosis risk, some foundries have part of the fettling work done in the open air, as for instance dressing with hand-grinding machines and mechanical chisels. It is not clear, however, to what degree these measures have reduced the exposure of the fettlers to dust. Accordingly, it is not yet known if the danger of silicosis has been eliminated; for evolution of dust in this type of work is the same whether it be done indoors or out of doors. In each case dust arises, but in the open air it is more readily dispersed from the place of work. Notwithstanding this, the fettler may very often inhale some of the dust before the dust cloud has been dissipated by the wind. Dust measurements are particularly advisable, therefore, for the evaluation of the silicosis risks in open-air fettling.

Medical Prevention

The medical prevention of silicosis is an important complementary factor in steel foundries and steelworks. Workers in quartz-crushing plants should be medically examined at yearly intervals. For personnel engaged in sand preparation, bricklaying with siliceous material, and knocking-out of steel castings, the first medical check can be made after five years, with subsequent examinations at two-year intervals. Those engaged with moulding or pouring steel castings need not be examined until they have been working for 10 to 20 years, and then, after this, at five-year intervals. Medical examinations are also advisable for those employed on other types of work with siliceous material in steel foundries, as for instance assemblers, coremakers and labourers. All of these occupational groups should be X-rayed before engagement, and those who have been employed in such work for about 20 years or more should also be examined.

The cleaning of steel castings, as will be evident from the foregoing, is far more hazardous than most of the other operations in foundries. These workers should be examined after five years work, with subsequent medical checks at intervals of one or two years. Medical examinations are also advisable in the case of employees who spend a good deal of time in the fettling shops without doing cleaning work themselves—inspectors, foremen, etc.—and should be carried out both at the time of engagement and after, say, 10 to 15 years work.

Changing of jobs should be undertaken wherever silicosis is liable to develop within a comparatively short time. The advisability should be considered of changing sandmixers, bricklayers, knock-out men and fettlers after ten years' work, regardless of whether they show positive X-ray findings or not. This is particularly important in the case of steel fettlers, in whom silicosis has a conspicuous tendency to develop severely. The changing of jobs can naturally be omitted if dust surveys reveal satisfactory occupational hygienic standards.

Non-ferrous Foundries

Only a small number of silicosis cases have been recorded in workers at non-ferrous foundries in this country (Sweden). Since the work largely resembles that which is normal in iron foundries, with sand-moulding, casting, knocking-out and fettling, the exposure to dust is likely to be similar; hence dust-suppression measures, where applicable, are recommended in accordance with those specified above for iron foundries.

Sand Blasting*

Cases of silicosis in sand blasters have been reported from many sources. Frequently the disease has been found to develop after only a few years' work and to show a strong tendency to disable the victim. A British investigation, reported in 1945, revealed that over 100 sand-blasters who died from silicosis had been employed on such work for an average of about 12 years. In one case death had occurred after working at sand-blasting for only about 20 months. In each of these cases the diagnosis was verified by an autopsy. Experience in Sweden suggests that the durations of exposure in sand-blasters with silicosis vary considerably.

The "sand" which is used contains a large amount of quartz and hence the dust evolved in blasting also has a high quartz content. Steel shot or grit, on the other hand, is prepared from non-siliceous iron or steel material, and the quartz content of dust produced in blasting is therefore dependent on the amount present on the surfaces blasted.

* It is not clear whether sand is always the abrasive referred to in these general comments. Its use for these purposes has been prohibited in UK foundries for many years—Editor.

There is no silicosis risk in the steel-sand blasting of non-siliceous material. In similar blasting of castings the quartz content of the dust, however, may be substantial because the moulding sand adhering to the surface is dislodged and partially disintegrates into particles which spread in the air.

Sand-blasting should be done in cabinets or chambers specially designed for the purpose and the sand-blaster should be equipped with protective devices. Dust must not be allowed to diffuse from this compartment through other parts of the workshop. The preventive measures against silicosis vary a good deal from one case to another. When a sand-blaster is obliged to remain inside a blasting chamber, as for instance in cleaning of large castings, he should wear the entire protective suit complete with compressed-air helmet. Also essential is the regular checking of air lines, joints, sand-containers, etc. to ensure that they are dustproof. Daily cleaning and inspection of the personal protective equipment naturally must not be neglected; and the same applies to tidiness and cleanliness at the work-place.

Hitherto, the workmen's protection authorities in Sweden have recommended compulsory examination of sand-blasters after two years' employment and, thereafter, annually. Having regard to the varying occupational hygienic standards at different places of work, it has been proposed, however, that the extent of compulsory medical checks be varied with respect to the degree of dustiness. Where these standards are high, an interval of seven years might be permitted before the first medical examination is carried out. However, the present frequent medical checks should not be discontinued until meticulous occupational hygienic investigations have been conducted.

To prevent further cases of silicosis in sand-blasters, changing of jobs should already be undertaken before symptoms arise. Yet in view of the varying hygienic conditions at different foundries, it is impossible to define a general maximum duration of work for sand-blasters before changing jobs. The question will have to be settled separately in each case. Nevertheless, a sand-blaster should not pursue his trade for more than ten years, other than in exceptional circumstances. It must be emphasized, though, that adequate dust suppression is altogether preferable a measure to the periodic changing of jobs.

(To be continued)

REFERENCES

[1] Preventive measures against silicosis in foundries are treated, for example, in the following monographs: Health Protection in Foundry Practice, American Foundrymen's Society, Chicago (1952); Health of Ferrous Foundrymen in Illinois, P.H.S. Publication No. 31, Washington, D.C. (1950); and McLaughlin: Industrial Lung Diseases of Iron and Steel Foundry Workers, London (1950).

Company News

TATE ENGINEERS, LIMITED—Bowthorpe Holdings, Limited, has acquired a substantial majority of the issued share capital of the company, which was formed recently to take over the engineering activities previously carried on by Tate Bros., Limited, Portslade (Sussex). Mr. A. E. Tate and his son, Mr. J. E. Tate, continue as directors of Tate Engineers and owners of the balance of the issued capital.

LANCASHIRE STEEL CORPORATION, LIMITED—A reduction in the company's earnings is attributed to lower profit margins for seven months of last year and the effect of strikes. The dividend on the £4,500,000 ordinary capital is being increased by 1 per cent. to 12 per cent. for the year to September 28, 1957, with a final of 9 (8) per cent. Group manufacturing and trading profits have fallen from £2,985,652 to £1,901,826, and the net income is down from £1,465,652 to £901,826.

MIDLAND BRIGHT DRAWN STEEL & ENGINEERING COMPANY, LIMITED—Results, "a satisfactory conclusion to an unsettled year," are reported by the chairman, Mr. H. Hipkiss, who also states that as the improvement is shared by all group companies, the "decline appears to have been arrested." Orders are such as to make a good start to the new financial year, but the complex world affairs obscuring economic trends, make any forecast unwise. The net profit is £84,900 (£149,058) and the dividend is unchanged at 45 per cent.

WESTINGHOUSE BRAKE & SIGNAL COMPANY, LIMITED—The dividend on the £7,109,424 capital is to be increased to 10 (9) per cent. for the year to September 30, 1957. For the previous year a payment of 18 per cent. was made on the £2,666,034 capital prior to a one-for-one free scrip issue and a rights issue of 1,777,356 shares of £1 at 35s. per share on a two-for-three basis. Group trading profits have expanded to £2,143,466 (£1,733,122) and the group net balance is £906,351 (£763,679). The parent company's net profit is over £51,000 higher at £554,870.

GAS PURIFICATION & CHEMICAL COMPANY, LIMITED—The company is not declaring a final dividend for the 15 months to June 30, 1957. An interim of 1s. per 5s. share was paid at the end of March. For the year to March 31, 1956, an interim of 75 per cent. on £94,132 preceded a 400 per cent. scrip issue. A final of 25 per cent. was paid on the increased capital of £512,912. The present capital, as expanded by acquisitions, is £679,787. Group profits were £484,217, but after charging normal taxation of £126,676, and taking up subsidiaries' losses of £508,353, a deficit of £150,812 resulted.

FLETCHER, HOUSTON & COMPANY, LIMITED, high duty alloy and grey iron founders, etc., of Tipton (Staffs)—The dividend is 70 (60) per cent. on the one-class £76,000 capital for the year ended September 30, 1957. Consolidated 1956-57 profits improved from £153,523 to £159,235, but due to a heavier tax charge of £86,273 (£80,180), the net balance is somewhat lower at £72,962, compared with £73,343. Profits to last September include those of the new subsidiary, the Joseph Billingham (Ships' Tackle) Company, Limited, Cradley Heath (Staffs), for a period of 17 months. There is £1,366 transferred to capital reserve, being profits of the new subsidiary before acquisition in January, 1957.

CANADIAN PACIFIC STEAMSHIPS, LIMITED, has signed a contract with Vickers-Armstrongs, Limited, for the building of a new passenger liner at the company's Naval Yard, Walker-on-Tyne, with machinery built at Barrow-in-Furness. The contract is worth about £8,500,000 in dollars. The new 27,500-ton liner will be the largest in the Canadian Pacific fleet. The maiden voyage from Liverpool to Montreal will be in the spring of 1961.

Scottish Ironfounding Review

Despite the many problems still facing the light castings industry centred in the East Stirlingshire area, there have been signs during the past year that the industry is getting back to more normal working conditions. The industry has been operating on a steadier basis and there have not been so many fluctuations between overtime and short-time working. While in such an industry the future is not easy to foretell, there are indications that this better tendency will continue.

At the start of the year short-time working was apparent. It was feared that the continuance of the credit squeeze, the over-all economic state of the country, and the general uncertainty regarding future supplies of petrol and oil, consequent on events in the Middle East, might lead to this short-time working becoming widespread. As the year progressed, however, a considerable improvement took place and at the beginning of September there were only 70 workers in the industry employed on a short-time basis, compared with a total of 284 for the same period of the previous year. It is hoped that with the advent of more favourable trading conditions short-time working might disappear entirely in the near future.

The labour position has not been too serious during the past year, but there is still a difficulty in attracting apprentice floor moulders, and the industry has to compete in this field with the demands of new industries established locally—industries in which the work is cleaner and not physically so heavy. Several foundries in the Falkirk, Camelon, Larbert and Denny areas have their own technical internal training schemes, and developments in the industry have not been hampered by any serious lack of technicians.

During the year the volume of orders for the home market was fairly satisfactory, but the cutting down of new house-building had the effect of reducing the demand for such goods as baths, gutters and fitted goods. It is considered likely that this tendency will become more marked in the near future, and that foundries specializing in a wide range of castings for the building trade will be presented with a problem not easy of solution. Selling in overseas markets has also become more difficult as a result of steadily increasing competition. The best outlets have been in the US, Canada, and Malaya, but even these markets have been contracting, chiefly as a result of rising local production. Several of the larger ironfounding concerns have recently established subsidiary foundries in Africa and Australia, and these it is reported, are doing well.

The cost of raw materials continued to rise during the year, and in addition, the foundries had to meet higher wage bills and heavier transport charges. During the year, however, it can fairly be claimed that the position of the light castings industry has been strengthened. It can now confidently be regarded as one of the most progressive industries in the country, thanks largely to the mechanization schemes which have been carried out for the purpose of streamlining production and securing increased output of goods which are in steady demand. Prospects are also encouraging particularly for those foundries engaged in the production of engineering, electric power and general castings.

FOLLOWING SIX MONTHS of reconstruction work, the No. 1 furnace at the Cargo Fleet Works of the South Durham Steel & Iron Company, Limited, has been brought back into production. The company has now two fully automatic discharging blast furnaces of the latest design in operation at the works.

Cupola Growing?

That the cupola as a melting unit is growing in size and capacity is the belief of the Incandescent Heat Company, Limited, who use the following report of recent business to substantiate the statement:

"We recently shipped a pair of 20-tons per hour cupolas with Whiting swivel charger, automatic coke-handling and weighing equipment to the Indian Iron & Steel Company, Limited, Kulti, India, where a new foundry is nearing completion for the manufacture of Stanton-type spun pipes. For the new Midland Motor Cylinder Company's foundry at Smethwick, there have been recently erected two 20-tons per hour cupolas with wet-type dust arresters, and charging equipment, slag granulation and ancillary gear is now being erected. At the British Bath Company, Limited, Greenford, a pair of 12-tons per hour cupolas with wet arresters, swivel charger and automatic coke handling and weighing equipment have been put in. This plant is also fitted with a Cupodel hot-blast system and has been in operation for about four months on 16-hour shifts.

"In hand at present are three cupolas with wet arresters, each cupola having a rated output of 34 tons per hour and a shell diameter of 10 ft. 6 in. As far as the writer is aware, these cupolas will be the largest in this country and, when in the States early last year, it was conceded that these cupolas are 'king size' even by their standards. The plant is for the Guest Keen Iron & Steel Company, Limited, Dowlais, for ingot-mould production. Also in hand is a further pair of 20-tons per hour cupolas with Whiting wet arresters and complete slag granulation for the Brightside Foundry & Engineering Company, Limited, Sheffield, also for providing metal for ingot-moulds."

(The Editor wonders if this is a general trend and would welcome news of other noteworthy installations.)

Radiation Appointments

Radiation Limited, announce the appointment of Mr. A. J. Parker as managing director. Mr. Parker, who was appointed to the Radiation board in 1954, is a specialist in industrial management and has been actively concerned in production engineering for many years.

The board also announce the formation of a new company—Radiation Group Export Sales, Limited—which will take over the export selling activities of all the subsdiary companies in the group. The amalgamation of the export sales resources has the dual objective of providing a comprehensive service to overseas customers for appliances for all fuels and to further the development of existing and new export markets. Mr. J. Ivan Yates, a member of the parent board, becomes managing director of the new company. Mr. S. Burton-Smith has also been made a director. The general offices of this company are at 122, Kings Road, Chelsea, London, S.W.3.

Mr. F. A. Hooper has asked to be relieved of his day-to-day duties, and has resigned from his position as managing director of Radiation Group Sales, Limited, but will retain his seat on the boards of Radiation, Limited, and Radiation Group Sales Limited. Mr. C. T. Baker-Carr, a director of Radiation Group Sales Limited, will co-ordinate the activities of the Radiation Gas group of companies; Mr. W. A. Ballard will take over similar additional responsibilities in connection with the Radiation Solid Fuel group of companies, and Mr. Eric Bellingham, general manager of solid-fuel-appliance sales, has been made a director of Radiation Group Sales, Limited.

European Foundry Apprentice Competition

Background Information and Commentary on Last Year's Event

The proposal to hold an annual competition for apprentice moulders was made by commission No. 1 (Training) of the European Committee of Foundry Associations.* The whole European Committee welcomed the proposal as a means of improving apprenticeship training and stimulating recruitment.

Form and Content of the Competition

It was agreed by commission No. 1 that the competition should consist of a substantial test in moulding and core-making practice and written tests in drawing, calculations and foundry technology. The scale of marking gave approximately 60 per cent. of the total marks to the practical test. Each country represented on the commission was asked to submit suggested subjects for the tests, and the final selection of subjects was made by drawing lots. To enable the necessary pattern equipment to be manufactured, this was done in respect of the practical test early in the summer of 1957. The choice of subjects for the written tests, was, however, made before the judges.

The first competition was held from November 25 to 30, 1957, at the Gewerbliche Beruf- und Fachschule, Bad Cannstatt, Stuttgart. Detailed arrangements for the competition,† including the provision of pattern equipment, were undertaken by the German foundry trade association (*Wirtschaftsverband*) under the general direction of Mr. L. Frede, chairman of commission No. 1. Mr. R. Guerin of Paris was appointed by the commission to be chairman of the judges.

Participating Countries

Six member countries of the European Committee entered apprentices for the competition. Of these, three countries (France, United Kingdom, Western Germany) entered teams of three apprentices. Holland and Belgium entered two each, and Austria one. (The full list of competitors in the final order of marks is shown in Table I.) Each participating country was invited to appoint up to three judges to attend the competition. France, Holland, United Kingdom and Western Germany appointed three judges, and Belgium one. No Austrian judge was present (the full list of judges is given in Table II).

All competitors from the six countries taking part lived in a hotel at Bad Cannstatt, where the members of the German delegation were also staying. Competitors, judges and other delegates had luncheon together on most days during the week, and there were several formal and informal gatherings during the week, which everyone attended as the guests of the German foundry trade association.

Opening Ceremony

Competitors, judges and other delegates attending the competition were present at the opening ceremony in the Council Chamber at Stuttgart City Hall on Monday, November 25. They were welcomed by the Mayor of Stuttgart (Dr. Klett) and heard speeches from Mr. W. Hoevelmann, president of the *Wirtschaftsverband Giesserei Industrie*; Mr. L. Frede, Mr. R. Guerin, and Dr. Ditlmann, secretary general of the German Chamber of Industry and Trade. The Mayor of Stuttgart and several other speakers referred to the significance of the competition as a means of promoting co-operation and understanding between industrial workers of European countries. The point was made several times that industrial co-operation will be really effective if it does not stop at the leaders of the industry. Following the opening ceremony, all competitors and delegates took luncheon at the City Hall.

Conduct of the Tests

Drawing

Delegates from the participating countries met before the opening ceremony in the City Hall, to make the choice of the subject for the drawing test, which was held on the afternoon of the first day. Three hours were allowed for the test. The paper chosen was the German suggestion, which had been prepared in advance in a form considered suitable for the British candidates. A number of alterations were, however, necessary, and were made by the British judges. A copy of the test is available,† the test was designed to find out how well the competitors understood a drawing and for this they had to make two sections and a plan from a technical drawing provided.

Practical

The practical test began at 8 a.m. on the Tuesday, following a preliminary meeting of judges at 7.30 a.m. Eleven of the candidates had chosen to work in cast iron, one in steel, one in aluminium and one in bronze. At the conclusion, the mould by the steelfounding apprentice was cast in iron, and the two non-ferrous moulds in aluminium. The job, which was the same for all competitors, consisted of a housing for gears, the finished castnig in iron weighing approximately 56 lb. Identical patterns and coreboxes were provided for each candidate, there being nine separate cores in the job. In order to leave sufficient floor space for free movement of competitors and judges, seven of the apprentices began with the manufacture of the

* Co-ordinating body for the UK: the Council of Ironfoundry Associations, 14 Pall Mall, London, S.W.1.

† See JOURNAL. July 25, p. 109; October 24, p. 482 and November 7, 1957, p. 542.

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moulds, whilst the remaining seven were making their cores. Two sets of cores were required, one for assembly in the mould and the other for judging. The seven candidates engaged in moulding during the morning went to coremaking in the afternoon, whilst those who began with coremaking proceeded to make their moulds. Moulds and cores were completed on the Tuesday, leaving the mould assembly, closing and pouring to be completed on the Thursday.

Technology and Calculations

The technology and calculations tests, for which two-and-a-half hours and two hours respectively were allowed, were held on the Wednesday, the judges again meeting beforehand to make the choice of test-papers and translate them as required. The technology paper chosen was that submitted by Germany and consisted of five questions on foundry technology and one essay on a foundry technical subject. The calculations paper chosen was the French and this had previously been prepared in a duodecimal version for the British candidates.

The translation of the answers to the technology paper proved to be a much larger job than had been foreseen and occupied a number of the judges and other delegates attending for much of Thursday, whilst the practical test was being completed, and all day Friday, when the finished castings were being judged. Arrangements were made to enable every judge to be present in the foundry when he wished to be in order to complete his marking. Competitors themselves were free on Friday and were taken on a tour of Stuttgart and district.

Results and Closing Ceremony

All competitors, judges and other delegates assembled at the Kursaal, Bad Cannstatt, at 11 a.m. on the Saturday, to hear speeches by Mr. de Jong, chairman of the European Committee, by Mr. Hoevelmann and by Mr. Frede. Awards were presented to the competitors and all delegates attending were subsequently entertained to luncheon by the *Wirtschaftsverband Giesserei Industrie*. A certificate is to be posted to each candidate to commemorate his participation in the competition.

Meeting of the Organizers

A meeting of commission No. 1 of the European Committee, most members of which had been in attendance at the competition, was held on the Saturday afternoon and evening, and on Sunday morning, to review the conduct of the competition and make recommendations. It was agreed to recommend to the European Committee that the competition should be held annually. It was also agreed that the chairman of the judges of the competition, who is in practice responsible for most of the arrangements, should continue to be appointed by the commission but should be a national of the country in which the competition is to be held. It was agreed that, subject to the approval of the European Committee, the competition should be held in Paris in November, 1958 and that Mr. Guerin should again be chairman of the judges. Baron Krayenhoff was appointed vice-chairman, with a view to his becoming chairman in 1959 when the competition would be held in Holland.

A lengthy discussion followed on the form of the written and practical tests, but little progress was made towards reaching full agreement. It was, however, decided that the time for the question paper on foundry technology should be reduced to two hours and that the questions set should be of a kind which required answering in five to ten lines.

TABLE I.—*Competition Results.*

Final Order.	Name.	Nationality.	Firm.	Points.
1st	W. Steinheider	German	Friedr. Krupp, Essen	134.10
2nd	H. Loh ..	German	Buderus'sche Eisenwerke, Wetzlar	133.45
3rd	L. Coppin ..	French	Acieries de Paris-Outreau, Outreau	126.75
4th	F. Maas ..	French	Usines Metallurgiques de Marquise, Rincent	122.45
5th	J. Touellou ..	French	Usines Renault, Billancourt	120.76
6th	W. Habes ..	German	Eisenw. Mülheim-Meiderich, Werk Meiderich	119.25
7th	J. Beek ..	Dutch ..	Konings, Swalmen ..	110.40
8th	K. Sucher ..	Austrian	Vereinigte Wiener Metallwerke, Wien 16	109.20
9th	R. Spencer ..	British..	J. Smethurst & Son Limited, Warrington	104.30
10th	P. Roberts ..	British..	Bridge Foundry Compay Limited, Walsall	100.05
11th	A. Champagne	Belgian	ACEC, Marcinelle ..	96.15
12th	J. Kempers ..	Dutch ..	Ten Cate, Needе ..	96.00
13th	E. Sykes ..	British..	H. Downs & Sons (Huddersfield) Limited	92.50
14th	M. Pirard ..	Belgian	Ecole. Techniyoc-Huy	85.60

Team Placings: First, Germany 386.80 points; *second*, France (369.42), and *third*, Great Britain (296.85).

TABLE II.—*Judges Appointed by Participating Countries.*

Belgium: Mr. Forbelets.

France: Mr. R. Guerin, of Etablissements Aubry Père et Fils, Aubervilliers/Seine, and lecturer at *l'Ecole Superieure de Fonderie*, Paris; Mr. G. Gauthier, chief technologist of the Department of Technical Studies, *Syndicat Général des Fondeurs de France*, Paris; and Mr. Durand.

Holland: Mr. A. De Bruin, Baron A. Krayenhoff, of the Bureau Opleinding Gieterijpersoneel, Utrecht, and Mr. J. L. Weggeman.

United Kingdom: Mr. J. Bamford, National Foundry College; Mr. J. W. Gardom, IBF past-president; and Dr. J. G. Pearce, C.B.E., director, British Cast Iron Research Association.

Western Germany: Mr. Greine, senior foundry lecturer at Gewerbliche Beruf und Fachschule, Bad Cannstatt, Stuttgart; Mr. Kopp and Mr. Mohnfeld, training officer, Gelsenkirchen.

The following persons were also in attendance for all or part of the time: *Denmark:* Mr. Jepherson,* foundry manager, Burmeister & Wain. *France:* Mr. G. Dumay, director of professional training in the *Syndicat Général des Fondeurs de France*, and Mr. D. Waeles, president of the *Commission Nationale de la Formation Professionnelle du Syndicat Général des Fondeurs de France*. *United Kingdom:* Mr. J. Blakiston, Mr. S. O. Bricknell, Mr. J. J. Collett* and Mr. W. S. Matthews. *Western Germany:* Mr. L. Frede,* senior foundry lecturer, Essen, and Mr. H. Frommert,* *Wirtschaftsverband Giesserei Industrie*, Düsseldorf.

* Members of commission No. 1.

only. Regarding the practical test, it was agreed that pattern conventions in the participating countries should be observed and that a drawing should be provided with the pattern to each candidate. It was also agreed that the properties of the sand provided should be fully explained to the candidates beforehand.

Photographs taken during last year's European Foundry Apprentices' Competition held in Stuttgart. They show: (a) Mr. R. Spencer, one of the three British entrants; (b) Mr. John Gardom and Mr. J. Blakiston (right) watching a French competitor at work and (c) other competitors at work on drawings.

COMMENTARY*

Value of British Participation

The British judges and observers present throughout the competition feel that participation in 1957 was well worthwhile. It gave an insight into foundry apprentice training in some continental European countries and into the possibilities and problems of international co-operation in this field, which could not have been gained in any other way. Individually, the members of the British delegation who were present have reservations about the appropriateness of the competition, or certain parts of it, to the training of apprentice moulders; their views on this reflect differences of attitude to apprentice training and varying opinions as to the needs of the foundry industry. Should a competition at this level aim at encouraging the really exceptional all-rounder, the apprentice whose craft, skill and proficiency at making a first-class casting is supported by wide technical knowledge and the ability both to understand and express himself on technical matters? Should it, alternatively, be a test solely of practical skill on the foundry floor? The British judges and observers who attended the competition last year, being widely representative of the British foundry industry as a whole, would inevitably place the emphasis at different points. They are agreed, however, that the competition, as conceived by the European Committee of Foundry Associations, can be the means of stimulating recruitment and of improving standards of apprentice training, and that it deserves to be warmly supported in future years by the British foundry industry as a whole.

* A consensus of opinion submitted by Mr. J. J. Collett, training officer, Council of Ironfoundry Associations.

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(The Training Committee of the Council of Ironfoundry Associations considered reports on the competition at their meeting on December 9 and unanimously endorsed these general views of the judges and observers as to the value of the competition.)

Selection of Competitors

When the decision to participate in 1957 was taken, it was widely recognized that the selection of British competitors would be largely a matter of chance. This weakness in selection is only in part attributable to lack of time. The real difficulty in selecting the three best apprentice moulders is inherent in the loosely organized system of apprenticeship training in the UK as compared, for instance, with Germany and France. In Western Germany more than 2,000 apprentice moulders were recently taking their apprenticeship tests at the end of a three-year training period (*i.e.* at the age of 18 or 19). The tests are conducted regionally but conform to a national standard and a common pattern (practical test of approximately 12 hours' duration, and written tests in technology, drawing and calculations). Selection of the three best apprentices in any one year is therefore a comparatively straightforward matter. In fact, it appears that the top fifty apprentice moulders passing their tests in Western Germany last year were taken to comprise the "short list" for the competition, and subsequently re-tested twice, before the final choice of competitors was made. In France, too, apprenticeship training is so organized that selection of the three best candidates in any year can be made with far more assurance than is possible in the UK at present.

The UK's difficulties in selecting competitors thus derive from a general weakness in apprentice training: the lack of any agreed standard of proficiency. It is beyond the scope of this commentary to debate the advantages and disadvantages of a comprehensive national scheme of training with agreed standards, but without such a scheme it is difficult to see how the UK can ever choose competitors for an event of this kind and not leave a good deal to chance. For the purpose of the competition, of course, a national test would only be useful if taken during an apprentice's eighteenth or nineteenth year, since the rules require candidates to be under twenty on December 31 in the year of the competition.

The foregoing paragraphs should not be taken to imply any criticism of the three British competitors. As is stated below, the judges and observers were unanimous in their view that they performed creditably. In passing, it may be noted that the competitors themselves appeared to be well aware of the somewhat random manner in which they had been chosen. Or should the foregoing be understood as a reflection in any way on the Institute of British Foundrymen, whose branches received nominations and, in some cases, made the initial selection on which the "short list" of nine candidates was based. Indeed, without the co-operation of the Institute selection would scarcely have been possible at all.

Standard of Competitors

It would be dangerous to base wide generalizations about the calibre of foundry apprentices in the participating countries solely on the evidence of the competition. Of the three "teams" taking part (British, French and German), the German competitors appeared to be of a high general educational standard, and both they and the French competitors showed up well in their written answers to questions on foundry technology. This may reflect their familiarity with this type of written work, and the importance attached to it, because it is an essential part of apprenticeship training, and not an optional extra. What is clear is that theoretical and practical work are closely related in German and French apprentice training, and it is regarded as natural that proficiency in one should be matched by proficiency in the other. Indeed, the distinction between "theory" and "practice" which is commonly made in this country appears to have little meaning for the German or French apprentice.

Standard and Conduct of Tests

The British judges and observers are agreed that the standard of difficulty of both the practical and written tests was reasonable and that they provided a good basis for judging the candidates' ability. It is perhaps inevitable that in a competition of this sort some advantages should lie with the competitors in whose country it is taking place. In Stuttgart unfamiliarity with the kind of sand and with certain of the tools and other items of equipment used in the foundry, combined with language difficulties which arose when materials were required, were to the disadvantage of competitors from the visiting countries. Many of these difficulties could be overcome in future years by more detailed planning beforehand, and doubtless they will be in the light of last year's experience.

Apart from these general considerations, the British judges were critical of a number of details connected with the running of the tests. They felt, for example, that clearer instructions should have been given to all competitors and that the number of judges present at any one time should have been strictly limited. Neither the practical nor the written tests were conducted under examination conditions. Doubtless many of the difficulties which arose could not be foreseen and, in some cases, they appear to have arisen because the chairman of the judges was resident in Paris, although all detailed arrangements for the competition naturally had to be made in Germany. Suggestions for improving the on-the-spot arrangements for the competition are being sent to the chairman of commission No. 1 of the European Committee and to the chairman of the judges.

Having regard to the circumstances in which the competition took place, the performance of the British competitors deserves praise. They responded well to the tasks which were set and appeared to tackle the tests in a methodical manner.

(*Continued on page* 81)

Parliament discusses Pneumoconiosis

The incidence of pneumoconiosis among foundry workers was the subject of a lengthy debate in the House of Commons recently and this was significant of the increasing awareness at Government level of the immediacy of the problem. For this reason, and because the discussion involved a clear statement of the existing state of affairs and of the progress of precautionary and preventive measures currently applied, it has been considered worthwhile in what follows to present this section of the debate practically in its entirety

Pneumoconiosis was raised by Mr. Malcolm MacPherson (Labour member, Stirling and Falkirk Burghs), who pointed out that, while the matter originated in his own constituency, its application was a general one. He was, he said, concerned about the existence of dust in the atmospheres of foundries and the effects of that on the health of foundry workers. In the past, a foundry worker spending a lifetime in a foundry had been likely to find himself spending a lifetime exposed to dust which in the course of time could affect his lungs, and, if he were unfortunate, shorten his life considerably.

The industry was, of course, one of a high degree of craftsmanship, but also—and this was one of the things which probably contributed to the incidence of the disease—one in which there was a high degree of sheer hard graft. It was one of those industries in which there was still an enormous amount of sheer back-breaking hard work, and that fact made the treatment of dust diseases rather more difficult.

A tremendous amount had been done in recent years, especially since the publication of the Garrett Report. He appreciated, as did all the workers in the industry in his constituency, the amount of improvement which had taken place, an improvement due very largely to co-operation among Her Majesty's Government, through the Factory Inspectorate, the employers and the employees. The Iron Foundries Joint Standing Committee, which had been set up some years ago as a consequence of the work of the Garrett Committee, had also done extremely useful work, and the first Report which it had produced a year ago was part of the data upon which he was relying for a good deal of what he had to say. But in spite of all that had been done, it was still possible for a new official appointed to one of the unions, who had come along with him that evening, to say that after a few months in his job he was absolutely appalled with the proportion of foundry workers, particularly dressers, who fell victim to pneumoconiosis.

The official had given him some figures—not official ones—and he, too, was appalled. The official had reported that he had a membership of about 150 dressers, of whom 30 had applied for benefit because of pneumoconiosis in the last three or four years. Those figures showed that in spite of the work which had been done in foundries, foundry workers, particularly dressers, were still seriously endangered by pneumoconiosis. Mr. MacPherson instanced one figure, which though not an official one was, he said, sound enough, of X-ray examinations undertaken in 1953/4 in selected areas including Falkirk. They had been carried out by Dr. Meiklejohn of Glasgow University, who had published the results. He had said that he had examined 28 dressers and had found 11 to be suffering from pneumoconiosis, leaving the possibility that others might contract it later. Those figures suggested how desperately serious the position still was in foundries.

There were two broad lines along which one could try to remedy the situation and one was very much more fundamental than the other. The lesser in importance was that of the workers themselves taking steps to protect themselves against dust in the atmosphere, for instance, by wearing respirators. The problem here was that although the employers provided respirators, the workers who should wear them did not always do so. There was a still serious problem for the workers to solve on the workshop floor.

Safety Devices

In that respect, there was a tremendous amount to be done, but it was in the other and more fundamental matter that the more important improvement had to be made. The essential was not so much the taking of precautions by the individual workers, but a change in processes in such a way that dust was not freed into the atmosphere. The ultimate ideal would be a process of ironfounding which would not permit the emission of dust into the atmosphere. That was the ideal which could not be achieved right away, but part of it, with modern knowledge and techniques was possible.

In the old-established floor moulding, it was a good deal more difficult, but with mechanized moulding it would appear there was much more chance of completely eliminating the emission of dust. That was not the case in spite of the nature of mechanized foundries, and at least at two key points—knock-out and sand reconditioning—there was still a good deal of what might be called "slack" which could be taken up in efforts to control the emission of dust. This led him, he said, to the general suggestion that in all these processes the tools which were used should be fitted with some kind of dust extractor or exhaust. This was commonplace in the case of a great many modern tools; they were made in such a way that the dust was contained. In the business of dressing, for instance, if the rumbling barrel was efficient it did not usually emit dust into the atmosphere. Hand wire-brushes, however, which were used to a considerable extent in his constituency, could have precautionary apparatus fixed to them, but they did not. Generally speaking, a great deal more could be done in that respect in most foundry work, particularly fettling.

Parliament discusses Pneumoconiosis

When such devices became available, would it be possible to make their use compulsory? Compulsion was undesirable so long as things could be done by co-operation. An enormous amount had been done by co-operation, but much ground remained to be covered. When compulsion was suggested in matters of that sort the foundry employers were apt to say that a tremendous amount had been spent in recent years, and this would cost a great deal more—but what was involved in the long run was life and death—and not always in such a very long run.

There was at least a case for saying that whenever the devices were available, they should be fitted. A case had been made recently by Mr. Dugdale (Labour Member, West Bromwich) for providing tax incentives when such devices were used—not penalizing the failure to use them, but rewarding their actual use. Mr. MacPherson's constituency was a fairly happy one in this respect, but in some parts of the country slum foundries existed and there co-operative employers were lacking. The case for further compulsion was worth considering although he was not a wholehearted advocate of it. If, however, it would save a good deal of the serious diseases which were contracted and of the early deaths which resulted there was a case for it.

There was a need to improve working conditions generally. Co-operation in the last few years had resulted in improved conditions, and the introduction of the 1953 Regulations had helped, but among the foundry workers in his constituency there was a continual suggestion that the Regulations were not stiff enough, and that they were not being enforced strictly enough. There were, he supposed, few industries which owed more to the Factory Inspectorate than the foundry industry. The Inspectorate had done an enormous amount of good, but it could probably do still more to enforce the necessary standards.

Since pneumoconiosis took about five or six years to develop normally it should be possible to watch young workers coming into the industry and to try to make sure that none of them fell victim to it. It should be possible to give them a medical examination for this disease periodically and, when there was the slightest sign of their falling victims to any dust disease, to take the necessary steps, even if it meant asking them to move to another industry.

X-ray Examinations

In the case of adult workers, the recent X-ray survey had shown the value of carrying out rather more X-ray examinations. Periodical X-ray examinations would be extremely useful, but the question arose whether this form of examination had not been relied upon too much in the past for diagnosis. It would be useful to workers in the foundry industry to know more about this, if the Minister had any information. There had been a certain amount of criticism of the X-ray examination, as giving not quite so much information as people had been inclined to believe. Would the Minister state what he thought of the possibility of setting up in ironfoundry centres pneumoconiosis clinics where provision might be made for heading off the onset of the disease? The question of what happened after a man had got pneumoconiosis or suspected that he had it was, Mr. MacPherson said, the concern of the Ministry of Pensions and National Insurance. The case of the first he would pass over for the moment to consider that of the other man—and there were a great many in his constituency—who thinks that he has pneumoconiosis, goes to his doctor; is told by the doctor that he has it; is sent to the infirmary; is told by the infirmary that he has it, and is then sent to the pneumoconiosis medical panel which tells him that he is not suffering from it. He then appeals to the medical tribunal, and the tribunal says that he has not got pneumoconiosis.

Question of Benefit

That was all right if the man afterwards lived a happy and healthy life; but he did not usually do so. Although told that he had not got pneumoconiosis he very often found himself going through the same stages as he would if he had got it. In the long run, the diagnosis might be exactly and strictly correct, but in a great many cases the man had some lung condition which would have arisen because of his work. In the purely technical sense it was possibly not pneumoconiosis. Mr. MacPherson wanted to know whether it was possible for such cases to be followed up. After a few years it should be possible to tell whether the original diagnosis, or the tribunal's diagnosis, was right. It should be possible, following up these cases, to know whether the present procedure was sufficiently effective and whether it covered the sort of cases that arise. He would like to think that not merely sufferers from the exact described disease could obtain benefit, but that anyone who was suffering severely from exposure to dust in foundries could do so, whatever the exact description of his medical condition might be.

The question of benefit was secondary to that of prevention, but it was important. The onset of the disease was long and slow. A man had usually worked a great many years of his life before he had pneumoconiosis, and it was not easy for him to change his mode of life. The only thing which could give him comfort was benefit, so that benefit was important, even though it was not so important as prevention. He emphasized the seriousness of this matter from both points of view. He would conclude with a remark which, he said, he had heard fairly frequently. It was a common saying amongst those who work in foundries that to go into that kind of work "took ten years off your life." That might be an exaggeration; on the other hand it might not. The average life of a dresser indicated that it might not be. Whether there was any truth in it or not it was something which was widely believed and this showed the seriousness of the matter. If there was truth in that belief there was cause not merely for a gradual step-by-step improvement, but a

serious attack on this disease and on the conditions experienced by those who work in foundries.

The Parliamentary Secretary to the Ministry of Labour and National Service, Mr. Robert Carr, said that he had listened carefully to Mr. MacPherson and was glad that the Joint Parliamentary Secretary to the Ministry of Pensions and National Service was present to hear those parts of his speech dealing particularly with insurance matters. The main purpose of the debate was to enable the hon. Member to hear the Ministry of Labour view about the control and possible prevention of pneumoconiosis.

He agreed that the question was most important. It was a risk in foundries to eliminate which everything possible should be done. Mr. MacPherson had a particular concern and interest because of the amount of foundry work that went on in his constituency. He shared that interest for a different reason. He had had some experience of working in a foundry, not an iron foundry, but an aluminium foundry, where conditions were somewhat easier. However, it gave him some appreciation of the problems involved.

He was glad to hear Mr. MacPherson say that work in an iron foundry was one of the few occupations where there was "hard graft." Unless one had worked in a foundry one did not know what hard work was. Mr. MacPherson had said that many people believed that working in a foundry, particularly in the dressers' shop, cut ten years from one's life. There was, of course, no statistical evidence to support such a statement. Indeed, the statistical records were not sufficient to provide a picture of the extent of the pneumoconiosis risk in foundries. But, figures apart, there was a problem here, and there existed a fear which forbade complacency.

Co-operation by Industry

The Ministry had, and were still, attacking this problem and would go on doing so in close co-operation with both sides of the industry. That co-operation was important and he was glad to hear the references to the effects of existing co-operation. He did not want to belittle the need for a legislative background in some of the work, but the more he saw of it the more he was convinced that real progress was usually made by co-operation. The legislation should be there and should be enforced, but real, positive progress came from developing an atmosphere of consultation and co-operation within the industry, and between the industry and inspectors from his own department and other officials.

There was certainly too much dust in foundries, and it was the intention to do everything that was practicable to reduce and control it. The work which had already been done, not only since the Iron and Steel Foundries Regulations came into force, but for many years previously, and particularly since the publication of the Garrett Report, should not be under-estimated. While they must certainly not be complacent, or pretend there was no significant risk, they ought also not to speak of the subject in a way which would frighten people from entering the industry, and he appreciated the most responsible way in which Mr. MacPherson had raised this subject.

Of course, there was scope for further advance, and he hoped it was being made, but already if employers and individual workers—the two together—took proper care to make use of the existing techniques and appliances, there was no reason to fear taking employment in a foundry. He wanted to say that because this craft trade was of immense importance to the economy of the country, and in the next few years, with the great growth of young people leaving our schools and needing employment, it was important that the foundries should get their fair share of these young people. Because it is a craft trade, it was work which offered real satisfaction to those who took part in it.

Therefore, on the one hand, entrants and would-be entrants into the industry must be assured that everything which could be done was being done to reduce the risk the whole time, and, on the other, that, provided reasonable care was taken in the light of modern knowledge, both by employers and individual workers, there was no need for fear about going into the industry. In saying that, he did not think that it was being complacent; he certainly did not want to belittle what Mr. MacPherson had said about the incidence of the disease which had come to his notice. Of course, this was a slow-developing disease, and the changes and improvements which had been made were not yet fully apparent. They would be seen in a number of years to come, in what it was hoped would be a decrease in the number of cases.

Speaking generally about the question of prevention, which was the special responsibility of the Ministry of Labour, Mr. Carr said that since the war, a considerable amount of new legislation dealing with this matter had been brought into force. The occupiers of foundries were now under an obligation to maintain appropriate standards of cleanliness in foundries, and that alone was an extremely important matter. The use of sand had been prohibited in the blasting of castings and other articles, and the use of free silica had been prohibited in parting powders.

The Iron and Steel Foundries Regulations, 1953, had represented the first attempt to deal with these foundries, as such, by special Regulations, and certain of the provisions relating to dust were a very considerable step forward. He mentioned in particular, the requirements about the separation of processes and the use of protective equipment.

Among other protective equipment, it was obligatory under the Regulations for the occupier to supply approved respirators in certain conditions, and it was also obligatory on the employed person to make full and proper use of the equipment and to report without any delay the loss of, or defects in, that equipment. This, he said, answered one of the points which Mr. MacPherson had made. There was an obligation here to provide protective equipment on the employer, and an obligation on the worker to use it and to report loss or defects without delay; and it was most important that both

these obligations should be carried out.

Mr. Carr said that he knew from experience of some years as a foreman in a foundry that it was not always easy to get workers to use the equipment that was provided. There seemed to be great difficulty in getting people consistently to use goggles or respirators or other special clothing which was properly provided for them. Further, in the legislative framework, there was special provision against young persons being employed in blasting processes, or being near one unless effectively protected from dust.

It was too soon to say what the effect of these requirements would be. The disease was slow to develop, but it was definitely the view of the Factory Inspectorate that the Regulations, taken together, were having a real effect upon working conditions in iron foundries.

MR. MACPHERSON said that there was one point on the general question not brought out when he was speaking. There had been a great deal of improvement and there probably would be further improvement because some of the Regulations would take effect later. One of the things to notice was that improvement was uneven. Some firms, as the recent X-ray survey showed, were bad firms, whilst others were better. One of the problems was to make sure that when progress took place, it took place everywhere and that the bad firms were brought up to the standard of the good firms.

MR. CARR said that this was absolutely true throughout industry and not only throughout the foundry industry. If only the average could be brought up to the level of the good there would not be much further work to do. The problem was how to do it to a large extent. Perhaps since Mr. MacPherson had intervened on that point, he would move straight to a question which he had been going to deal with later. Mr. MacPherson had suggested that the Regulations were not stiff enough. He wanted to point out that the Regulations had been fully operative only since January, 1956, barely two years, and that before any talk about the need for new Regulations—unless any unperceived gap appeared—the existing Regulations should be applied and general progress made. The making of Regulations was not by any means simple; they took a great deal of thought and research, and very often the very people—not only factory inspectors—who were now engaged on them could be doing more immediate practical work by getting the state of the existing knowledge applied to the Regulations. There was always a difficult balance to strike. It was time to go ahead and try to improve the legislative framework. Much of the work had to be done in the factory by enlightened and knowledgeable people. Time could be consumed to a very large extent in making mere reports and regulations.

Tied up with the stiffness of the Regulations was the question whether the Factory Inspectorate was firm enough in enforcing the existing law. If Mr. MacPherson ever had evidence that they were not he would be glad to inquire into the case, but, generally speaking, he did not think that it was so. He supposed that Mr. MacPherson was suggesting that the Inspectorate was too reluctant to prosecute when he suggested that it was not firm enough in enforcing the law. He could be assured that where the Ministry became convinced that the occupier was failing to do what was reasonably practicable in the light of modern developments, the policy was to prosecute.

Mr. Carr stressed again the importance attached to co-operation, in securing the improvements in working conditions in industry. The Iron Foundries Joint Standing Committee, which had been mentioned, was an admirable example of it. The object was to make progress. Particularly, in view of the fact that the Iron and Steel Foundry Regulations had been fully in force for less than two years, however, it was believed that the most potent methods of achieving that progress were by consultation, advice and persuasion. The Department and its inspectorate were wholehearted in their attempts to this end.

Incidence of Disease

Having said something about the general position and dealt with the strength of the present law and its importance, Mr. Carr turned to some other points raised and also to the work in hand for future progress. Fundamental investigations had been going on over a long period into the incidence of the disease. Repeated medical examinations in foundries had been made and knowledge was continually expanding. Whenever appropriate, the results were published and the particular value of these studies from the point of view of the Ministry of Labour was the way in which they related the hazard to particular processes so that the dangerous processes, and where remedial or preventive measures were most urgent. were discovered. The work of the Ministry's medical inspectorate in this matter had been of great practical value and constituted a contribution widely recognized, not only in this country but well beyond it. The Ministry was fortunate in having eminent workers in this field.

The first objective should be to reduce and control the dust. Although important, the provision of effective protection for the worker and ensuring that everything possible was done to make the worker use the equipment provided was only the second line of defence. Mr. MacPherson had said that there should be effective exhaust ventilation for dust control on all processes, including particularly those of the dressing shop or "fettling shop," as it is called, and that fettling tools, whether fixed or portable, power-driven or hand-operated, like the brushes he had mentioned, should be properly protected. Where reasonably practical devices already existed, their use was definitely compulsory under the existing Regulations and there was no need for new Regulations to make them so.

The obvious point of doubt was sometimes at what stage the new development had become rea-

sonably practicable and, therefore, obligatory. It was a matter on which there was bound to be differences of opinion. There was also the question, when a basic piece of equipment or device had been developed, of the time and trouble which needed to be taken in tailoring it to meet the needs of different types of production. There was no doubt that formidable problems still existed in the development of dust-control devices.

He could, he said, give many examples, and the Report on Conditions in Iron Foundries by the Joint Standing Committee was at once an indication of the complexity of these problems and of the directions in which the Ministry was seeking remedies for them. For example, it had under consideration research in a large number of fields. To mention a few, there was the application of local exhaust ventilation for all dressing tools except the cut-off wheel; exhaust systems for dust removal at fettling wheels on stand grinders; exhaust systems for dust extraction at knock-out; and the design of an exhaust system for the removal of dust generated by knock-out in pit moulding, where weight and design make the separation process of knock-out physically impossible. This research was in different stages. In some cases, it was already bearing fruit and equipment was becoming available. In other cases, several years of research, although elucidating fundamental issues, had not produced concrete solutions and there was still a lot to be done. It was fair to say that research and development work had been done and was being done by a number of organizations and bodies and a great deal by the industry itself, which he thought, was a particularly encouraging sign.

Existing Facilities

Another point that Mr. MacPherson had made was that pneumoconiosis clinics should be established in foundry areas. Throughout the country there were facilities for the diagnosis and treatment of chest diseases. He was not aware of any particular difficulty having been experienced in foundry areas. The point he was making was that it was the facilities for chest examination which were important and these existed. Provided those facilities existed, he doubted whether there was much cause for special pneumoconiosis clinics. If the hon. Member had any particular area in mind where the general facilities for chest examination were proving difficult, he would certainly like to look into the matter and take it up.

Mr. MacPherson said that he understood that the diagnosis of pneumoconiosis was extremely difficult. Therefore, in an ordinary clinic which had not a special bent towards that kind of work it might not prove a very easy task.

MR. CARR said that he would certainly look into that matter and consider it. If he thought that there was anything in it, he would get into touch with Mr. MacPherson. The need for medical examination had also been mentioned. Mr. Carr knew of a number of foundry areas where works doctors provided services of that kind and made regular medical examinations. He would like to see that practice extended. Compulsory medical examination, however, raised a much wider question, including consideration of a much larger field of workers at risk in many occupations. That was altogether beyond the scope of a short Adjournment debate such as that. Mr. MacPherson had mentioned young workers. Of course, in this industry, as in every other industry, they were examined not only on entry, but once a year for the first few years after they came in, up to the age of 18.

Also mentioned had been the possibility of financial assistance being given by the Government to employers to help them in installing machinery to cut down dust. It seemed to him that any such provision would be a complete reversal of existing policy and, clearly, would have far-reaching consequences. He did not think that it was a matter that could be considered in isolation as affecting work in foundries. The proposal was contrary to the principles of the Factories Acts. There was a duty to people to take precautions. They ought not to be given incentives to do what was their duty. Insofar as they affected taxation, there were very serious complications and it would be impossible for him, on behalf of the Government, to accept any commitment like that. This was a most important, very wide and complicated subject. The diagnosis problems alone were serious. He assured Mr. MacPherson that he would look further into the points he had raised. The Ministry treat this subject very seriously and admitted that there was a problem. They were not complacent about it and intended to go on trying to improve the progress which had been made in the last few years.

MR. ARTHUR TILEY (Conservative and National Liberal Member, Bradford West) asked:—Was there not consultation with the insurance companies about this matter: They were carrying out such huge research that, of all people, they knew where the danger spots were from the complaints which arise. MR. CARR said that he did not know with any certainty the answer to that point. However, in all the work done in connection with factory and industrial diseases, co-operation was received from a great range of bodies and it was improbable that any organization carrying out extensive work was not in touch with the Ministry. He would make sure that it was so.

First Convertible Rights Issue

An issue of £3,500,000 6 per cent. convertible unsecured loan stock, 1976-81, at 99, for Richardsons Westgarth & Company, Limited, marine, turbine, electrical, and general engineers, of Wallsend-on-Tyne, is the first rights issue of such stock. About £2,955,000 stock is to be offered to members of the company registered on December 31 for subscription by way of right on the basis of £1 loan stock for every four stock units held.

Up to 100,000 of stock will be reserved for allotment in response to applications submitted by the staff and employees of the group. The balance of stock will be available for issue against excess applications.

Foreign Economic Reports

The following extracts have been prepared from recent economic reports emanating from the Export Services Branch of the Board of Trade. In each case an attempt is made to include mention of trends which may influence foundry business.

Japan:—The Ministry of International Trade and Industry was reported to have submitted a 10-year estimate of probable growth in the mining and manufacturing industries in Japan, for use by the planning authorities. According to the Ministry's calculations, Japan's industrial production would rise between 1957 and 1962 at an average annual rate of 10.2 per cent. The rate of increase would slow down thereafter to some 3.9 per cent. on average between 1962 and 1967. These figures compare with 9 per cent., the average annual rate from 1934-1940, and 12 per cent., the rate from 1951-1955. The figures show estimated production increases for steel and non-ferrous metals.

The Ministry of International Trade and Industry was reported, however, to be concerned about the failure of steel ingot producers to curtail output sufficiently to avoid over-production during the October-December period. It was said to believe that production in the second half of the fiscal year ending March 31, 1958, must be kept at least 15 per cent. below the level reached in the first half. It was the Ministry's wish to avoid unnecessary import and consumption of raw materials, and to prevent further deterioration of the domestic market which was believed to have been on the point of rallying—later it was announced that the three major steel companies had decided to reduce their standard quotations for bar and section steel by some Y3,000 per ton, as from November shipment.

Spain :—Local industry, although able to satisfy the needs of the country for the straight-forward types of machine tool, is quite unable to cater for the considerable demand, created by Spain's increasing industrialization, which comes mainly from the railway engineering workshops and shipyards, and new industries such as motor vehicles, tractors, etc., not to mention the demand from Spanish arms factories.

Import licences are granted on a fairly liberal scale from all countries for such equipment as large planing, drilling and boring machines, precision-grinding machines, fully automatic lathes, precision lathes, vertical lathes of 2 metres and over, gear-cutting machines, heavy shipyard plate-bending machines, railway wheel turning lathes, vertical milling machines and wire-drawing machines. United Kingdom products are well introduced and greatly appreciated on the Spanish market, and compete in price and quality with those of USA and German origin.

It is estimated that Spain's demand for imported machine tools amounts to between eight and ten million pounds sterling per year. But, due to the rapidly increasing industrialization of Spain, this figure may well increase, and should be taken merely as an indication.

One of the most efficient methods of advertising machine tools is by exhibiting them in the Barcelona and Valencia Samples Fairs, when the machines can be demonstrated and can be examined by prospective buyers. The expenses of setting up stands at these Fairs are usually met by the agents, but in some instances the Swiss, German and French firms have shown their products together in large collective stands.

Italy :—The general economic situation remains stable, and the outlook is encouraging both for the balance of payments and for industrial production. Trade figures for the first eight months of 1957 show that the unfavourable balance of visible trade is only 1.2 per cent. above the figure at the same stage in 1956. In spite of a seasonal decline in industrial production in August (when the index fell by 19 per cent.) the average index for the first eight months of the year was 8 per cent. above that at the end of August, 1956.

Production of steel in September reached the record figure of 593,000 tons compared with 518,000 tons in September, 1956. Production of pig-iron was slightly lower than in September, 1956 : 164,000 tons compared with 166,000. Total steel production for the first nine months of the year, at 5,016,000 tons, was 15.6 per cent. higher than during the same period in 1956. Pig-iron production, at 1,580,000 tons, was 11.5 per cent. above the 1956 figures.

Luxembourg :—The trend of Luxembourg's economic activity, which has been characterized by steady expansion over a number of years, is showing marked signs of levelling off over the last three months. Various factors suggest a slight reduction of economic stability : a very sharp increase in the cost of living; reported shortening of some categories of steel orders; depressive movements on the small local stock exchange, quite unprecedented in recent years and largely connected through the operation of the Belgo-Luxembourg Monetary Union, with the current financial difficulties of the Belgian Government; and the Belgo-Luxembourg deficits with EPU.

Whereas iron and steel production during July was still at a higher level than in 1956, August and September showed a steady decrease. For the first time in 1957 the production of iron and steel was below the monthly average of 1956. In particular, orders for laminated rolled products seem to have fallen off. Iron-ore output was reported to be still on the increase as a result of the extension of open-cast mining.

France :—Steel production during September, 1957, was 1.2 million tons, an improvement of 200,000 tons over the previous month. Production of steel during the first nine months of the year was 10.3 million tons.

Some details of the objectives of the third modernization plan, as it affects the steel industry, were published. The plan envisages increasing French steel production from 14.5 million tons in 1957 to an annual rate of 18.5 million tons at the end of 1961 and will call for investment at the rate of 100-110 milliard francs a year, which is rather more than 20 per cent. of the industry's annual turnover. The production of Thomas steel in the total output is to be increased in view of scrap supply prospects.

Finland :—A protocol was signed in Helsinki on October 4, 1957, between Finland and France concerning trade between the two countries for the period October 1 to December 31, 1957.

French exports to Finland included :—cast-iron pipes less than 400 mm. dia.; various metal goods, notably screws, bolts, nuts, rivets and hand tools; agricultural machinery and equipment; miscellaneous machinery, equipment and engineering plant, notably for hoisting, goods-handling, public works and boring. Among Finnish exports to France and French overseas territories was a range of machinery and equipment.

Belgian Congo :—The effect of the continued very low copper price on the general economy in 1957 could no longer be ignored despite the buoyancy of agricultural experts, and the authorities have been forced to take action to protect both Government revenue and the balance of payments. Increases in the

excise duties on petrol, alcohol and tobacco, and in telegram and telephone charges, have already been made, and a general increase in customs duties on a wide range of lesser essential commodities is believed to be under consideration. These imposts are all designed to reduce the budget deficit caused by the increased cost of the administrative, social and administrative services, the fall in revenue from export duties on copper and cobalt and the expected decline in the amounts of profits tax payable by the mining companies on current operations.

The level of imports remained high throughout the first half of 1957, and in fact the total for the month of June, 2,028 million francs, was a record. On the export side, the value of copper exports during the first half year was only 4,029 million francs as compared with 5,538 million francs in the corresponding period of 1956. Most of this fall was due to lower prices but the volume also fell from 128 to 118 thousand tons. As the price of copper shows no sign of recovery it is now almost certain that the returns for the second half year will show yet a further fall.

A great deal continues to be written about the Inga scheme, but much of this is repetitive or speculative, and the intentions of the Belgian Government have not yet been made known. Nevertheless informed opinion appears to be convinced that the first stage of the project will be started next year, and it is understood that German steel interests are working on plans to set up a steelworks on the Congo estuary based on the expected cheap power.

European Foundry Apprentice Competition

(Continued from page 74)

Judging

As stated earlier, many on-the-spot problems arose because too many judges and observers were present at the same time during the competition and their presence must have impeded the candidates in their work to some extent. Other complications arose in connection with the translation of many papers, the magnitude of the task involved not having been foreseen. These problems were overcome by on-the-spot improvisation and, apart from criticisms of this sort, the British judges and observers feel that the standard of judging in the competition was fair and reasonable throughout. The list of total marks awarded to candidates shows that there was close accord between the marking of the British judges and that of judges from other countries. In due course, it is hoped that a full list of marks awarded for the separate tests will be available to each participating country. On the evidence acquired in Stuttgart, there is every reason to think that this will bear out the general impression that there were no serious differences in marking among the judges present. The conclusion to be reached therefore is that the final order of the fourteen competitors represents a just placing according to their ability in moulding and coremaking and their all-round knowledge of foundrywork.

MUCH as they regret having again to do so, Borax Consolidated Limited, Carlisle Place, London, S.W.1 announce further price increases for borax and boric acid and details of the new rates may be obtained on application.

Contracts Open

The dates given are the latest on which tenders will be accepted. The addresses are those from which forms of tender may be obtained. Details of tenders with the reference ESB can be obtained from the Board of Trade Export Services Branch, Lacon House, Theobalds Road, London, W.C.1 (telephone: CHAncery 4411, ext. 738 or 771), unless otherwise stated.

NEW ZEALAND, February 9—Requirements: 192 picks (heads only), solid cast steel 8 lb., with one chisel point and one diamond point and with standard 3-in. by 2-in. solid oval eye. (ESB/31721/57.)

SUDAN, February 1—The Sudan Gezira Board invites tenders for the supply of the following:—12 two wheels trailers; 12 pumps; 12 sprayers. (ESB/31704/57.) Further requirements include:—Rails and other items of permanent way material, details of which can be obtained from the Office of Controller of Stores on application. Closing date—February 10. (ESB/31790/57.)

BURMA, January 22—Requirements are: 50 Nos. mincing machines, hand-operated type, cast in fine grey iron and double tinned with three specially hardened stainless-steel cutters complete with clamp (big size). (ESB/31805/57.)

BACUP, LANCS, February 3—Supply of the following for a period of 12 months ending March 31, 1959, for T.C.: Drain pipes and fittings; manhole covers, gully grids, etc. Documents from the Borough Engineer, Municipal Offices, Bacup.

BELFAST, January 27—Following, during 12 months commencing June 1, for the City Council: Iron castings; wheelbarrows (steel). Documents from the City Surveyor's Department (Room 84), City Hall.

BRIDGWATER, SOM, January 27—Supply of the following from April 1, 1958, to March 31, 1959, for T.C.: Cast-iron goods; ironmongery. Documents from the Borough Treasurer, Town Hall, Bridgwater.

CARMARTHENSHIRE, January 30—Following requirements for the year ending March 31, 1959, for C.C.: (1) Supply and delivery of tools and ironmongers' goods. Documents from J. L. Richards, county engineer and surveyor, Roads and Bridges Department, County Hall, Carmarthen.

CLEVEDON, SOM, January 25—Supply of the following materials, for U.D.C.: Tools, plant and overalls; ironmongery. Documents from the Engineer and Surveyor, Council House, Clevedon.

COVENTRY, January 23—Supply of tools, holloware and general ironmongery, for City Council.

HAYES AND HARLINGTON, MIDDX, January 20—Supply of the following for the year ending March 31, 1959, for U.D.C.: Cast manhole covers, frames and road gully gratings; lamp columns—cast-iron and steel; small tools and plant. Documents from the Enginer and Surveyor, Town Hall, Hayes.

KING'S LYNN, NORFOLK, January 22—Supply of the following for 12 months ending March 31, 1959, for T.C.: Gully gratings, manhole covers, etc. Documents from the borough engineer, H. G. Ridler, Clifton House, 17, Queen Street, King's Lynn.

PEMBROKESHIRE, January 30—Supply of the following for the financial year ending March 31, 1959, for C.C.: Supply of cast-iron gully gratings and frames, manhole and footpath covers, etc. Applications to the county engineer and surveyor, W. Brundan, County Offices, Haverfordwest.

NORTH RIDING, January 27—Following are required during the year ending March 31, 1959, for C.C.: Cast-iron manhole covers, kerb outlets, gullies and grates. Applications to the County Surveyor, County Hall, Northallerton, enclosing a stamped addressed foolscap envelope.

STOCKPORT, CHES—Following for a period of 12 months from April 1, 1958, for T.C.: Iron castings. Documents from the Borough Surveyor, Town Hall, Stockport. Tenders by January 31.

STOCKPORT, CHES—Supply of the undermentioned for the period April 1, 1958, to March 31, 1959, for T.C.: Spun-iron pipes, cast-iron special castings and cast-iron flanged fittings; non-ferrous saddles for service connections; sluice valves; fire hydrants; valve extension spindles; surface boxes; water meters (rotary piston type). Documents from Engineer and Manager, Water Department, Town Hall, Stockport. Tenders by January 15.

Latest Foundry Statistics

Ironfounding: The working population of the ironfoundry industry increased by 440 during October, according to the Council of Ironfoundry Associations. On November. 2, the total was 138,375, whilst on September 28 it was 137,935. A year ago, however, employment was running at 142,031. The employment of females during October rose by 63 and in early November was 9,523.

News in Brief

KENT CONTINENTAL SOCIETE ANONYME, the Belgian subsidiary of George Kent, Limited, Luton, Beds., announces that, as a result of the expansion of its activities, it moved into larger premises during November at 27, rue Paul-Emile Janson, Brussels.

EXPENDITURE EXCEEDING £500,000 for the modernization of the North and Old docks at Garston (Lancs) has been authorized by the British Transport Commission. This brings the total estimated cost of work at the port, either in progress or authorized, to over £1,250,000.

SUFFOLK IRON FOUNDRY (1920), LIMITED, announce through a new price list (No. 11157) that they have increased the prices of certain of their welding products, namely, aluminium, steel and iron rods and also fluxes. There has been no increase in the price of bronzes.

THE Agricultural Engineers Association announces that exports of farm machinery in 1957 were a record, being valued at over £90,000,000, against £70,000,000 in 1956 and £1,500,000 in 1939. Home market sales of £66,000,000 last year brought the total to £156,000,000.

AT THE 17TH MEETING of the European Federation of Chemical Engineering there is to be a joint symposium on the "Organization of Chemical Engineering Projects" at Olympia, London, June 24, 25 and 26, on the occasion of the Chemical and Petroleum Engineering Exhibition.

HADFIELD'S, LIMITED, Sheffield, presented inscribed walking sticks to workers who had served the firm for more than 50 years, on January 10. A lady was presented with an umbrella. Among those present were Lord Dudley Gordon, and Mr. A. Roebuck, retired works director.

THE ACCIDENT frequency rate at the Ebbw Vale steelworks of Richard Thomas & Baldwins, Limited, during November, was the second lowest ever recorded, according to the company's safety inspection committee. Only 47 lost-time accidents occurred in the entire company during the period.

UNILEVER, LIMITED, has donated £21,000 to the Manchester College of Science and Technology under a seven-year Deed of Covenant. Out of the sum, £2,000 is to be allocated to the staff college, while the balance will be divided equally between the chemistry and chemical engineering departments.

DURING THE THIRD QUARTER of 1957, Swedish production of pig-iron was 303,100 *tonnes*, sponge iron 26,600 tons and ingots and castings 531,400 tons. Production of forgings (including wrought iron) was 18,900 *tonnes*, rails, sections, beams, and angles, 35,000 *tonnes*, and plates, sheets, and strip, 93,800 *tonnes*.

WALKER, CROSWELLER & COMPANY, LIMITED, of Cheltenham, have announced an immediate price reduction for their Unatap spray tap, a combined hot- and cold-water mixing-tap. Although it has been on the market for only 12 months, increasing demand has enabled the manufacturers to reduce the cost.

AN AGREEMENT has been signed within the last few weeks between Leyland's and ENASA, owner of the Pegaso automobile factories in Spain, regarding the manufacture of trucks, buses, industrial units and ancillary equipment, with the object of increasing the export of Pegaso and Pegaso-Leyland products to world markets, especially Latin America.

AS A RESULT of the transfer of the division to the Sentinel Works at Shrewsbury, the Clan Foundry of Rolls-Royce, Limited, at Belper, which is part of the oil-engine division, is to be closed down. All of the 30 employees will be offered work at either Shrewsbury or in the company's aero-engine division at Derby. The premises will revert to the Ministry of Supply.

FIFTY MEMBERS of the Engineering Society of the Vulcan Foundry, Limited, Newton-le-Willows, Manchester, locomotive builders, visited English Steel Corporation, Limited, Sheffield, on January 11. The Sheffield firm supplies the foundry with springs, automatic couplers and one-piece bogey frames. The visitors had luncheon at the works and afterwards saw the Sheffield Wednesday v. Portsmouth football match.

A course on industrial and factory law will be held under the auspices of the Industrial Welfare Society on February 4, 5 and 6 at Robert Hyde House, 48, Bryanston Square, London, W.1. Mr. Harry Samuels, M.A., barrister-at-law, will be the lecturer. The course covers the legal groundwork necessary to industrial managers and executives. Particulars can be obtained from the administrative officer of the Society at the address quoted.

THE LORD MAYOR OF BIRMINGHAM, Alderman J. J. Grogan opened the new Midland branch offices of the National Union of Manufacturers in Easy Row, Birmingham, on January 7. Mr. William Blackwell the NUM Midland president, presided at the ceremony, and representatives of the Federation of British Industries, the Board of Trade, the Allied and Engineering Employers' Federation and the Birmingham Chamber of Commerce attended.

Mr. ARNOLD GOUREVITCH spoke about the life of the outstanding surgical genius, Professor George Jordan Lloyd when he addressed the Non-Ferrous Club at its monthly luncheon at the Queen's Hotel, Birmingham, on January 7. Mr. Gourevitch is honorary surgeon at the Queen Elizabeth Hospital, Birmingham, and several other Midland hospitals. At the meeting a collection, taken on behalf of the Commonwealth Fund for the Blind, realized £14 16s.

Mr. S. W. MARTIN, managing director, Staveley Iron and Chemical Company, Limited, and Mr. S. N. Turner, deputy managing director, were among directors present at the annual staff social of the firm on January 10. It was held for the first time at the Bradbury Hall, in Chesterfield, because the dining rooms used previously were not sufficient to accommodate the numbers. Mr. W. Knight conducted the Staveley Works Band for old-time dancing.

CONTRACTS VALUED at £4,000,000 have already been placed as part of the development scheme for the Rhodesian Iron and Steel Company's works at Redcliff, Southern Rhodesia, which it is reported will cost £8,000,000. The largest contract, for coal-handling, coke ovens and by-product plant, has been awarded to Powell Duffryn Coppee Limited, and is worth £1,250,000. The contracts should be completed by 1960 and estimated production at that time will be 150,000 tons of crude steel and 160,000 tons of pig-iron.

CONTRACTS valued at over £3,500,000 have been placed by the British Transport Commission for two passenger and two cargo vessels for the Channel Islands service of British Railways' southern region. The two passenger ships, each of about 3,800 gross registered tons, will be built by J. Samuel White & Company, Limited, Cowes, Isle of Wight, and the cargo vessels, each of about 1,000 gross registered tons, by Brooke Marine, Limited, Lowestoft. The latter vessels have

been specially designed for rapid mechanized cargo handling in bulk or by pallets.

THE BRITISH TRANSPORT COMMISSION announce that a contract has been placed with the Birmingham Railway Carriage & Wagon Company, Limited, Smethwick, for 45 main-line diesel-electric locomotives of 1,550 h.p. each, for use on the Kent Coast lines of the Southern Region of British Railways. These lines are to be electrified under the Kent Coast Electrification Scheme, the first phase of which, providing for the extension of electrification from Gillingham to Ramsgate and Dover *via* Faversham (including the Sheppey Branch), is due to be completed in 1959.

A 10-TON BARGE-MOUNTED excavator which has been specially designed for the maintenance, dredging and widening of canals in the North of England was launched on the Leeds and Liverpool Canal at Skipton on Monday, January 6. J. C. Bamford (Excavators) Limited, Rocester, Uttoxeter, have been producing the excavators for the past 10 months but this is the first time one has been mounted in this way. The pontoon on which it is mounted has four hydraulic legs which can be extended four feet underneath it to stand on the bottom of the canal and so provide maximum stability.

THE METAL PHYSICS COMMITTEE of the Institute of Metals is organizing a one-day symposium on "Metallurgical Aspects of Semi-Conductors," to be held on Tuesday, February 25 at the College of Technology, Gosta Green, Birmingham. A number of short papers will be presented, but will not be available in advance of the meeting. Visitors will be welcome; tickets are not required. In conjunction with the meeting, an exhibition is being arranged at the College by the Royal Radar Establishment, Great Malvern. This will be open on February 25 and also on the evening of Monday, February 24.

SIR EDWARD THOMPSON, chairman of the John Thompson group, addressed members of the John Thompson Supervisors Association at their annual dinner early this month. Representatives of all the subsidiary companies attended. Sir Edward said that the coming year must be one of consolidation; the prospects were good though there was delay in the placing of orders for the next stage of the atomic power station programme. During the dinner Sir Edward presented a medal and a cheque from the directors to Mr. Frank Lloyd, engineer, to mark his retirement. Mr. H. Peacock, chairman of the Supervisors Association, presided.

THE BOARD OF TRADE have had under investigation an application made by the United Kingdom manufacturers of silicones for the imposition of an anti-dumping duty on polymethylsiloxane fluids and emulsions (commonly known as silicone fluids and emulsions) imported from France. The circumstances have been fully examined and the Board of Trade are satisfied that dumping has taken place and, in the case of fluids, is still continuing, and that such dumping is causing material injury to a United Kingdom industry. The Board have, therefore, made an order, the Anti-Dumping No. 1 Order, 1958, under the Customs Duties (Dumping and Subsidies) Act, 1957, imposing an anti-dumping duty of 4s. per lb. on polymethylsiloxane fluids originating in France and manufactured by the firm known as Société des Usines Chimiques Rhone-Poulenc in order to offset the dumping of these goods in the United Kingdom. This order came into force on Tuesday, January 7. The Order (S.I. 1958 No. 2) is available from H.M. Stationery Office, Kingsway, London, W.C.2, and branches, price 2d. (by post 4d.)

Obituary

Mr. JOHN MILLS, manager of the family foundry business at Llanidloes, Montgomeryshire, has been killed in a shooting accident at the age of 31.

Mr. HERBERT SMITH, secretary of the Spenborough Engineering Company, Limited, Heckmondwike, has died at the age of 47. He had been associated with the firm for 31 years.

Mr. WILFRED G. DURDEY, joint managing director of Rose Bros., Limited, engineers, Gainsborough, Lincolnshire, died on January 4 at the age of 65. He started with the firm as an office boy.

Mr. H. SMITH, former managing director of Abbotshaugh Engineering Company, Limited, Falkirk, has died. He was the elder brother of Mr. W. H. Smith, director of Allied Ironfounders, Limited.

Mr. W. MANN, aged 61, a storekeeper at English Electric Company, Limited, Phoenix Works, Thornbury, Bradford, has died following an accident which occurred during the moving of a pile of metal.

Mr. AUBREY WELLS, chairman and managing director of the Lion Foundry Company, Limited, Kirkintilloch, died suddenly on January 10, at the age of 81. He joined the firm as a director in 1920; 20 years later he was appointed managing director, and in 1952, he became chairman of the company.

Mr. JOB HOLLAND, former chairman of Pickford Holland & Company, Limited, refractory goods manufacturers, Sheffield, died on Saturday, January 4 at the age of 91. He was for many years a leading Sheffield industrialist and was a president of the Refractories Association. He was awarded the O.B.E. in the 1948 Birthday Honours List.

Forthcoming Events

JANUARY 20

Institute of Vitreous Enamellers

Midland section: "Electric Furnaces for Fusing," by H. Bryan, 7.30 p.m., at the Birmingham Exchange and Engineering Centre, Stephenson Place.

JANUARY 21

Institute of British Foundrymen

East Anglian section: "Manufacture of Aircraft Engine Castings," by C. W. Wilson, 7.30 p.m., at the Lecture Hall, Public Library, Ipswich.

JANUARY 22

Institute of British Foundrymen

Birmingham branch: "CO_2 Process at Blakeborough Foundries," by T. C. Wilson, 7.15 p.m., at the James Watt Memorial Institute, Great Charles Street.

Institution of Mechanical Engineers

Applied Mechanics group: Discussion: "Measurement of Noise and Vibration," 6.45 p.m., at 1, Birdcage Walk, Westminster, London, S.W.1.

JANUARY 23

Institute of Metals

Birmingham local section: "Electric Furnace Developments," by P. F. Hancock, B.A., 6.30 p.m., at the Birmingham Exchange and Engineering Centre, Stephenson Place.

Association of Bronze and Brass Founders

Yorkshire area: "Survey of Furnaces for Melting Copper-alloys with Cost Data compiled under Production Conditions in Sand Foundries," by E. C. Mantle; meeting commences at 12.15 p.m., at the Great Northern Hotel, Leeds.

JANUARY 24

Institute of British Foundrymen

Birmingham branch: Annual dinner/dance, 7 p.m., at the Botanical Gardens, Edgbaston.

Bristol & West of England branch: "Shell Moulding," by D. H. Scott, 7.30 p.m., at the Grand Hotel, Bristol.

Personal

Dr. R. S. SILVER has been appointed general manager, technical division, G. & J. Weir, Limited.

Mr. H. G. HERRINGTON, managing director of High Duty Alloys, Limited has been re-appointed chairman of the Aluminium Industry Council.

Mr. S. J. STANBROOK has been appointed a director of Ascot Gas Water Heaters, Limited. He continues as general works manager at the Neasden plant.

Mr. G. W. HEMY, B.A., has been appointed chemical sales director of Joseph Crosfield & Sons, Limited, Warrington in succession to Mr. A. C. H. CAIRNS.

Mr. ELLMORE C. PATTERSON, a vice-president of J. P. Morgan & Company, Inc., has been elected a director of the International Nickel Company of Canada, Limited.

Mr. A. J. PERRYMAN has been appointed managing director of Catalin, Limited. He was previously joint managing director with Mr. J. E. CURRIE. Mr. Currie remains chairman.

Mr. R. R. HUNTER has been appointed a director of Swan, Hunter, & Wigham Richardson, Limited. He is general manager of the company's dry docks department at Wallsend.

Sir STANFORD COOPER has retired from the board of the Ford Motor Company, Limited following his appointment as a permanent Lay Member of the new Restrictive Practices Court.

Dr. G. SCHWIETZKE (Germany) on January 1 assumed office as president of the International Committee of Foundry Technical Associations in succession to Dr. A. B. EVEREST (UK).

Mr. M. CARTER has retired as managing director of Carter Gears, Limited, a subsidiary of Crofts Engineers (Holdings), Limited. He is succeeded by Mr. JOHN MIDGLEY. Mr. Carter remains an ordinary director.

Mr. J. F. HARPER has been appointed to the board of Bristol Aircraft as assistant managing director. Mr. J. W. READER HARRIS succeeds Mr. Harper as secretary of the parent company, the Bristol Aeroplane Company, Limited.

Mr. A. R. MATHIAS has been appointed chairman of the Lead Development Association for the current year. He succeeds Mr. H. L. EVANS. Lt.-Col. W. E. GREY has been reappointed chairman of the lead sheet and pipe section of the Association.

Mr. H. H. VALBERG has resigned his position as works manager of the Falkirk Iron Company, Limited, and will shortly leave for India to take up an appointment as works manager for the Indian Iron & Steel Company, Limited, at Kulti, West Bengal.

Mr. A. O. AHLQUIST has been appointed sales manager, mechanical department, of Metropolitan-Vickers Electrical Company, Limited. He succeeds Mr. H. LAWSON-JONES, who will act in an advisory capacity, and who is transferred to sales management.

Mr. R. F. HAYMAN, industrial gas officer of the Gas Council, has been appointed chairman of the industrial gas development committee of the Council in succession to Mr. W. H. TARN, whose term of office as chairman of the committee expired on December 31, 1957.

Mr. THOMAS M. PARKINSON, a castings inspector at Newton Chambers & Company, Limited, Chapeltown, Sheffield, completes 57 years with the firm this week. He was 70 years old on January 6 but deferred retirement to the weekend to complete the 57 years' service.

Mr. K. G. LAMPSON, Lt.-Col. P. F. BENTON JONES, and Lt.-Commander G. W. WELLS have been appointed directors of Steel Peech & Tozer, and Workington Iron and Steel Company, two branches of the United Steel Companies, Limited. Lt.-Col. Benton Jones has also been appointed a director of Beckermet Mining Company.

Mr. DUNCAN BAILEY, chairman of Charles Roberts & Company, Limited, Railway Wagon Works, Horbury Junction, near Wakefield, recently made presentations to three long-serving foremen to mark their retirement. They were Mr. GEORGE CASS, who has been with the company for 52 years, Mr. JAMES FAWCETT (39 years), and Mr. LEWIS PINDER (20 years).

International Nickel Company of Canada, Limited, announce that Mr. RALPH H. WADDINGTON, Mr. JAMES C. PARLEE, Mr. RICHARD A. CABELL and Mr. PAUL QUENEAU have been elected assistant vice-presidents. The last two have also been elected as vice-presidents of the International Nickel Company, Inc., the United States subsidiary of the company.

Mr. H. L. F. K. VAN VREDENBURCH, chief representative in the United Kingdom of the High Authority of the European Coal and Steel Community, relinquished his post on January 15. He is to return to The Hague in the service of the Netherlands Ministry of Foreign Affairs as Director-General of a newly-created division for European co-operation.

Mr. S. J. BELLAMY, assistant general manager of Peter Brotherhood, Limited, ironfounders and engineers of Peterborough, has been appointed general manager in succession to Mr. MARCUS NEAL, who continues as chairman. Mr. Bellamy, who has been with the company since 1924, has been a director since 1944, and assistant general manager for the past 11 years.

Mr. R. BEAN, who recently celebrated his eightieth birthday, has been working as a patternmaker in Dover for 65 years and is still working. He began with A. L. Thomas in 1892 and his birthday was marked by the present owners of the firm, the Dover Engineering Works, Limited, by a dinner party. The 10 persons present totalled among them 360 years' service.

The Council of the *Association Technique de Fonderie*, meeting in Paris on December 17, conferred honorary membership of the Association on Mr. V. DELPORT for the Great Services he has rendered in a liaison capacity in the foundry industry over many years. It will be remembered that only as recently as last spring Mr. Delport received an Award of Merit of the American Foundrymen's Society.

Amplifying the announcement made in the JOURNAL of December 12 about the retirement of Sir WILLIAM WALLACE from Brown Brothers & Company, Limited, Edinburgh, on December 31 last, the firm have made it clear that although he relinquishes his managing directorship, Sir William will continue to serve as a director and as chairman of the board of directors. Mr. C. C. MITCHELL succeeds him as managing director

Mr. T. WORSNOP, engineering department manager of Ransomes & Rapier, Limited, has retired after 43 years service with the company. Mr. Worsnop was a well known figure in engineering circles, both locally and nationally and represented the company on various British Standards Institute committees for many years. Mr. A. S. Stokes, technical director, presented Mr. Worsnop with a mahogany standard lamp, an electric razor and a fountain pen from his colleagues at Waterside Works.

Greater loads... higher lifts... longer flights with

GOODYEAR

RAYON CONVEYOR BELTS

A full range of rayon-carcass conveyor belts is available from Goodyear for applications where higher tension ratings are desirable. The special advantages of rayon belts make possible a fresh approach to new installations, and also help to eliminate many difficulties with existing installations.

Manufactured in three different weights of rayon and to a wide variety of cover specifications, we are able to supply the most economical belt for any type of service. With knowledge of your operating conditions we will gladly advise on the Goodyear rayon-carcass belt best suited to them.

Greater Efficiency

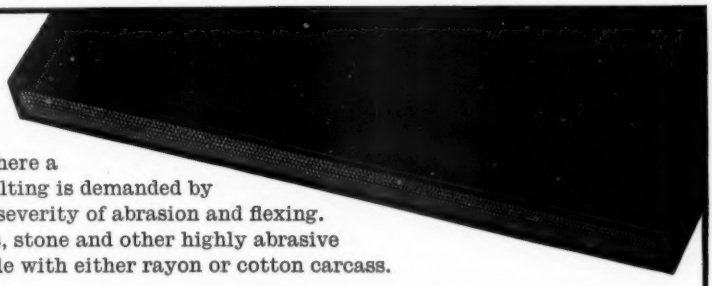
Higher tensions, with ample safety factor and less stretch, permit greater loads, longer flights and higher lifts. This means simpler layout, fewer transfer points and easier sequence control.

Better Troughing

The thinner construction ensures better troughing and less dead weight on highly-rated belts. The higher grades of rayon belting have ratings away above anything that is practical in cotton construction, and yet trough perfectly.

Longer Belt Life

Extra flexibility means that belts can wrap driving rollers and snub idlers more closely, yet retain the excellent impact resistance needed for loading points. Belts therefore last longer.



STACKER

Designed for use where a superior quality belting is demanded by the frequency and severity of abrasion and flexing. Ideal for coke, ores, stone and other highly abrasive materials. Available with either rayon or cotton carcass.

GOODYEAR

INDUSTRIAL RUBBER PRODUCTS

CONVEYOR BELTING · HOSE · V-BELTS · TRANSMISSION BELTING · FENDERS

Raw Material Markets

Iron and Steel

With the return to normal activities after the holiday period, the prospects for many of the foundries are uncertain, notably among the light, jobbing, and textile foundries. Efforts continue to be made to obtain additional business so as to bring production nearer to capacity. In the light-castings trade the restrictions imposed on building and the domestic equipment trades continue to have an adverse affect on the demand for castings and there is little hope of early improvement. Outputs are much below capacity and the shortage of work prevents full employment of their resources.

Fortunately, the trading position is much better among the engineering and speciality foundries. The motor vehicle industry is busy, and although the cut in imports in the New Zealand market will be severely felt by this trade, as well as the textile and other industries, it is expected that outputs will continue to be satisfactory. The orders on the books for machine tools are not so heavy as they were for both home and export, but this trade is still busy.

Outputs of pig-iron continue at a rate which, apart from the low-phosphorus irons, is more than sufficient to satisfy the needs of consumers. The 1957 production figures showed an increase of about 1,000,000 tons over the previous year's output, and had the necessity arisen additional quantities could have been obtained. Demands, however, particularly in recent months, did not keep in line with production, and makers are finding it necessary to increase stocks. The requirements of basic pig-iron for the steelworks has depreciated on account of the substantial tonnages in stock, and some producers find it difficult to dispose fully of their makes, while in some instances the furnaces have ceased to produce this grade of iron. High-phosphorus pig-iron is plentiful; home demands continue only moderate and export business can only be obtained against strong competition from overseas producers, although the withdrawal of the licensing control will be of assistance to export merchants. The makers of the low-phosphorus irons are in a happier position by being able to distribute all their iron, for which the demand is sustained. Hematite is in good supply, and refined irons are easy.

Home producers of steel semis continue to provide sufficient tonnages for the needs of the re-rollers, apart from the carbons and special quality steels. The re-rollers are in need of more orders for many of their products, particularly for small bars and light sections. Some business is on hand for overseas, but orders are difficult to obtain against the strong competition and lower prices of makers abroad.

Non-ferrous Metals

Non-ferrous metal markets remain featureless on both sides of the Atlantic, with interest of little consequence and price movements small.

Copper, in particular, is friendless, and at one time last week the London cash quotation struck a new low since 1950. This was in anticipation of a reduction in the US custom smelter price, which, as events proved, was lowered by ¼ cent to 25 cents a pound. Subsequently the market firmed slightly, but there was no significance in the moderately improved sentiment. In the US the producers are still holding to their 27 cents a pound price. Yet it is difficult to see how the custom smelters can maintain a price level of 25 cents, and should this level be breached it would be inevitable for the producers to lower their quotation. Moreover US scrap prices have weakened and reports speak of more material being on offer to the market than for some time. The consumption of copper in the UK is holding up surprisingly well. Chile is authorizing a 10 per cent. cutback in production and a somewhat similar reduction is being considered by the Belgian Congo.

The general consensus of opinion is that a 10 per cent. cut will do little more than help to stabilize prices at their present levels. The unexpected lowering of stocks in UK warehouses last week was most probably accounted for by copper being shipped over to the US, a move made possible by the wide disparity between the prices in the two main market centres.

Tin in London has been quietly steady and there are many who believe that the price is now due to rise, and substantially so, should US buying occur on any scale. The facts seem to be that there is little prompt metal about and should consumer interest revive on any scale the flow of tin metal to this country will be held up through the strike at the Penang smelter and the dislocation caused by the non-shipment of Indonesian concentrates. UK stocks, meanwhile, continue to rise and are now over 13,000 tons.

Lead has been a fairly good market, though quiet. One reason for this has been that shipments of the metal across to America are taking place and secondly there are many who feel that the present price may be too low. A further helpful factor has been the change in the Board of Trade's method of disposal of part of its stockpile. Originally the scheme was to off-load 7,200 tons in the first six months of this year. A total of 1,900 tons was to be open for tender and the balance was to be offered to the original suppliers. Now the scheme is to unload only 6,700 tons, of which 2,500 tons, which was included in the 5,300 tons to be offered back to the suppliers, will be for sale by open competitive tenders. Zinc is without feature, although because many feel that the price is too low and because nearby supplies are crossing the Atlantic, the undertone is firmer.

Recent Wills

DORMAN, A. J., youngest son of the founder of Dorman, Long & Company, Limited, Middlesbrough ... £17,493

PHILLIPS, J. F., joint managing director of the Universal Grinding Wheel Company, Limited, Stafford £54,337

HOPE, J. E. B., a director of Cellacite & British Uralite, Limited, manufacturers of asbestos goods, of London, S.W.1. ... ... £81,680

SOUTHALL, CHRISTOPHER, a director and former chairman of John Readhead & Sons, Limited, shipbuilders and engineers, of South Shields £101,578

LIVERMORE, B. W., a director of Keith Blackman, Limited, manufacturers of fans, gas heating apparatus, etc., of Tottenham, London, N.17 ... £9,671

ATKINSON, A. E., secretary of Niagara Forge (Sheffield), Limited, and previously for 40 years with Daniel Doncaster & Sons, Limited, iron and steel stockholders and founders, etc., of Sheffield ... £8,099

BALMWORTH, GILBERT, manager of Harland & Wolff, Limited, Belfast £8,368

BLEWITT, HENRY, formerly a partner in Blewitt & Sons (Metals), Limited, Lichfield (Staffs) £3,548

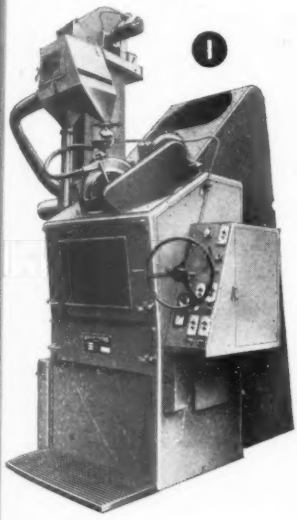
SHAW, SIR DOUGLAS, a partner in the family iron-founding business of Shaw & McInnes, Limited, Glasgow, until 1952, and Unionist MP for West Renfrewshire, 1924-29 ... ... £143,236

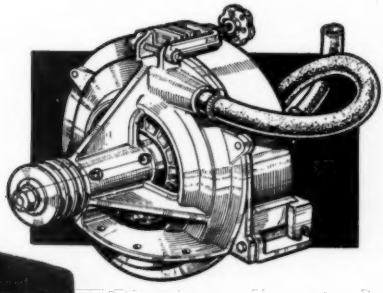
BERRY, J. W., deputy managing director of Birmid Industries, Limited, Smethwick (Staffs), and joint managing director of the Birmingham Aluminium Casting (1903), Company, Limited, Smethwick £31,259

BRIGHAM, E. B., joint managing director of Brigham & Cowan, Limited, engineers, shiprepairers, etc., of South Shields, and a director of the Hull Central Dry Dock & Engineering Company, Limited, the British Arc Welding Company (N.E.C.), Limited, and other companies ... £46,361

Shot Blast Equipment

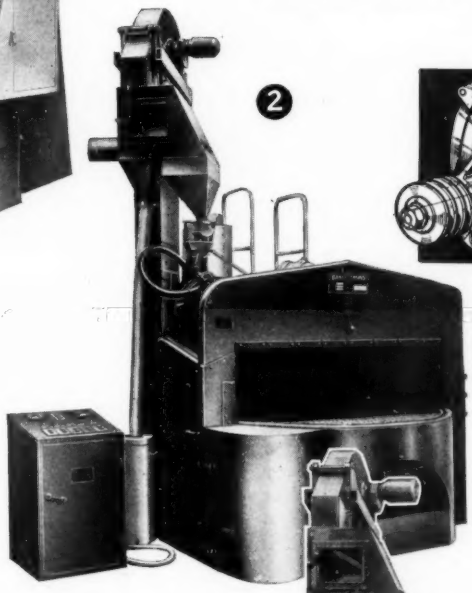
This A-S-L Turbine is the most modern Shot Blasting Unit available. The bi-phase air injection system enables shot to be projected at greater speeds using lower power with fewer replacements. The economies effected in spare parts alone are very substantial.

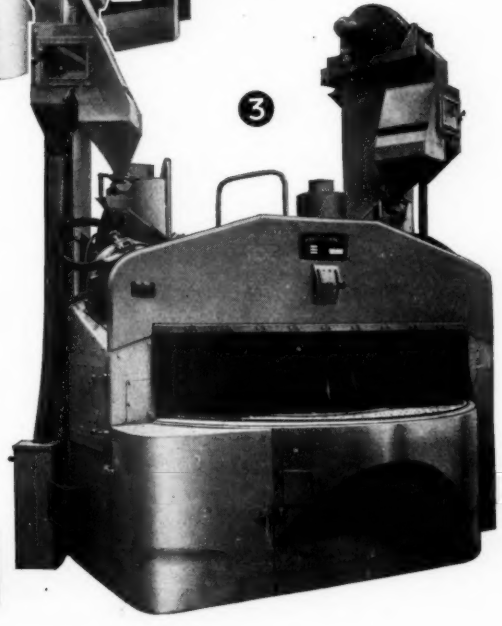




Baker Perkins High Speed Bi-Phase A-S-L Turbine, British Patent, No. 510681.

These machines do not require pits or special foundations.





1. **ROTARY BARREL**
2. **CADET**
3. **MEDIUM**

Our standard range of Rotating Barrel and Table Shot Blast Machines is capable of handling a wide range of Foundry products. Both types are semi-automatic, the rotating barrels being equipped with skip hoist loading gear and frontal discharge mechanism. These modern highly efficient machines are in use in Foundries all over the world, and are built to the high standards of design, materials and workmanship characteristic of all Baker Perkins' machines.

BAKER PERKINS LIMITED
ENGINEERS
WESTWOOD WORKS · PETERBOROUGH

Current Prices of Iron, Steel, and Non-ferrous Metals

(*Delivered unless otherwise stated*)

January 15, 1958

PIG-IRON

Foundry Iron.—No. 3 Iron, Class 2:—Middlesbrough, £21 6s. 0d.; Birmingham, £20 18s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £23 17s. 0d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si), d/d within 60 miles of Stafford, £24 1s. 3d.

Scotch Iron.—No. 3 foundry, £25 3s. 6d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 19s. 0d.; South Zone, £26 1s. 6d.

Refined Malleable.—P, 0.10 per cent. max.—North Zone, £27 6s. 6d.; South Zone, £27 9s. 0d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent.:—N.-E. of England (local iron), £25 6s. 6d.; Scotland (Scotch iron), Zone S. 1, £25 13s. 0d.; Sheffield, £26 15s. 0d.; Birmingham, £27 4s. 0d.; Wales (Welsh iron), £25 6s. 6d.

Basic Pig-iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leics.

FERRO-ALLOYS

(*Per ton unless otherwise stated, delivered*)

Ferro-silicon (6-ton lots and over).—45 per cent. Si, £48 10s. 0d. to £50 15s. 0d., scale 17s. 0d. to 17s. 6d. per unit; 75 per cent. Si, £68 10s. 0d. to £76 7s. 6d., scale 17s. 0d. to 17s. 6d. per unit.

Ferro-vanadium.—50/60 per cent., 27s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s. 6d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £299 0s. 0d.

Ferro-tungsten.—80/85 per cent., 8s. 3d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 11s. 3d. per lb. of W.

Ferro-chrome (6-ton lots and over).—4/6 per cent. C, £93 0s. 0d. to £96 10s. 0d., basis 60 per cent. Cr, scale 32s. 0d. per unit; over 6 per cent. C, £91 0s. 0d., basis 60 per cent. Cr, scale 31s. 0d. to 32s. 0d. per unit; 2 per cent. C,* 2s. 2d. per lb. Cr.; 1 per cent. C,* 2s. 2½d. per lb. Cr; 0.15 per cent. C,* 2s. 3½d. per lb. Cr; 0.10 per cent. C,* 2s. 3¾d. per lb. Cr; 0.06 per cent. C,* 2s. 4d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 7s. 3d. to 7s. 10½d. per lb.

Metallic Manganese.—90/92 per cent., carbon-free, £290 0s. 0d.; 96/98 per cent., £310 0s. 0d.

Ferro-columbium.—65/75 per cent., Nb + Ta, 20s. 9d. to 21s. 3d. per lb., Nb + Ta.

Ferro-manganese (home).—78 per cent., £87 19s. 3d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—Basic: Soft, u.t., £33 1s. 6d.; tested, 0.08 to 0.33 per cent. C, £34 1s. 6d.; hard (0.41 to 0.60 per cent. C), £35 3s. 0d.; silico-manganese, £44 2s. 6d.; free-cutting, £37 5s. 6d. Siemens Martin Acid: Up to 0.25 per cent. C, £41 7s. 0d.; silico-manganese, £44 10s. 0d.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft, up to 0.33 per cent. C, £38 16s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £39 18s. 6d.; acid, up to 0.25 per cent. C, £43 10s. 0d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £42 12s. 0d.; boiler plates (N.-E. Coast), £45 2s. 0d.; floor plates (N.-E. Coast), £44 1s. 0d.; angles, N.-E. Coast, £40 6s. 6d.; joists, N.-E. Coast, £40 2s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., and flats, 5 in. wide and under, untested soft basic, 50 tons and over, £40 8s. 0d. (under 10 tons to 4 tons, £41 5s. 6d.; under 4 tons to 2 tons, £41 10s. 6d.); hoop and strip, coils, £40 10s. 0d.; uncoated strip mill coils, hot rolled, under 3mm. to 12g., £45 16s. 0d.; black sheets (hand mill), 24 g., £59 4s. 6d.; galvanized corrugated sheets, 24 g., £67 13s. 0d.

Alloy Steel Bars.—1 in dia. and up: Nickel, £69 9s. 6d., nickel-chrome, £100 12s. 6d.; nickel-chrome-molybdenum, £112 16s. 6d.

NON-FERROUS METALS

Copper.—Cash, £173 10s. 0d. to £173 15s. 0d.; three months, £176 0s. 0d. to £176 5s. 0d.; settlement, £173 15s. 0d.

Copper Tubes, etc.—Solid-drawn tubes, 1s. 8¾d. per lb. rods, 201s. 6d. per cwt. basis; 20 s.w.g., 234s. 9d. per cwt.

Tin.—Cash, £730 0s. 0d. to £730 10s. 0d.; three months, £723 0s. 0d. to £723 10s. 0d.; settlement, £730 10s. 0d.

Lead (Refined Pig).—Second half January, £71 15s. 0d. to £72 0s. 0d.; second half April, £72 5s. 0d. to £72 10s. 0d.

Zinc.—Second half January, £61 15s. 0d. to £62 0s. 0d.; second half April, £61 5s. 0d. to £61 10s. 0d.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations 197 15s. 0d.; rolled zinc (boiler plates), all English destinations, £95 10s. 0d.; zinc oxide (Red Seal), d/d buyers' premises, £82 10s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 1s. 5¾d. per lb.; sheets to 10 w.g., 155s. 6d. per cwt. wire, 2s. 2¾d.; rolled metal, 155s. 6d. per cwt.

Brass (Brazing).—BS1400, B3 (65/35), £133; B6 (85/15), — ; BS249, —.

Brass (High Tensile).—BS1400, HTB1 (30 tons), £175; HTB2 (38 tons), — ; HTB3 (48 tons), £195.

Gunmetal.—BS1400, LG2 (85/5/5/5), £164; LG3 (86/7/5/2), £175; G1 (88/10/2/½), £228; (88/10/2/1), £219.

Phosphor Bronze.—BS1400, PB1 (AID released), £248 per ton.

Phosphor Bronze Strip, etc.—Strip, 231s. 0d. per cwt.; sheets to 10 w.g., — per cwt.; wire, 3s. 6½d. per lb.; rods, 2s. 9¾d.; tubes, 2s. 9¾d.; chill cast bars: solids 2s. 10½d., cored 2s. 11½d. (Charles Clifford, Limited.)

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 5½d. per lb.; round wire, 10g. in coils (10 per cent.), 3s. 10d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 3s. 9d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 5½d. per lb. Antimony, English, 99 per cent., £190 0s. 0d. Quicksilver, ex-warehouse, £70 0s. 0d. Nickel, £600 0s. 0d. Aluminium ingots, £197 0s. 0d.; aluminium bronze (BS1400), AB1, £211; AB2, — .

* Average 68-70 per cent.